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ScIELO



*The author at a stop on route Corumbá-Wayana*

Nelson Papavero

ESSAYS ON THE HISTORY  
OF NEOTROPICAL DIPTEROLOGY

VOL. II

MUSEU DE ZOOLOGIA  
Universidade de São Paulo

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FRITZ MÜLLER AND EMIL GOELDI

Essays on the history  
of Neotropical Dipterology



Museu de Zoologia  
Universidade de São Paulo

N. Papavero

Essays on the history  
of Neotropical Dipterology,

with special reference to collectors  
(1750 - 1905)

Vol. II

“οὐ γαρ τι νῦν γε καχθεῖ,  
αλλὰ ἀεὶ ποτὲ ξηταύτα.”

*‘For these things live  
not today or yesterday,  
but for all time.’*

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*To*

*Clifford O. Berg  
Charles H. Martin  
Joseph Wilcox*



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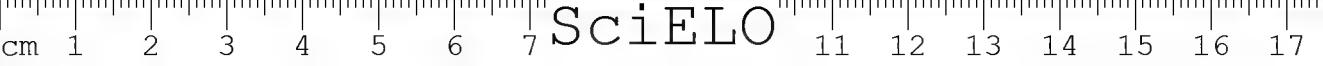
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## Introduction

With this volume the formal presentation of the history of neotropical dipteroiology is completed. The third and final volume will contain: a gazetteer of the locality names employed by some of the 18th and 19th centuries, authors, lists and location of types in European Museums, and portraits of authors and collectors.

Completion of the present volume was possible thanks to Grants "Biológicas 68/604" of the Fundação de Amparo à Pesquisa do Estado de São Paulo, "3289/69" of the Conselho Nacional de Pesquisas (Brazil), and especially the Grant of the John Simon Guggenheim Memorial Foundation (1971-72), which enabled me to consult several libraries in North America and Europe.

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*Chapter XI*

## British Collectors

### W. Swainson

WILLIAM SWAINSON was born in Liverpool on 8 October 1786, and very early in life began to study the natural sciences. In the second decade of the 19th century he decided to go to South America to collect. In a letter addressed to Prof. Jameson, of Edinburgh, he exposed the reasons which induced him to choose Brazil as the field for his researches (this letter was incorrectly translated in Portuguese by José de Agostinho de Macedo and published in the "Jornal Encyclopedico de Lisboa", 1830, vol. 1, pp. 124ff.).

The Regent Prince of Portugal, D. João VI, having opened the ports of Brazil to foreign nations, Swainson thought immediately of leaving England, and for that undertaking asked for his government's financial support. Sir Joseph Banks used his influence with the British Government, but nothing was obtained. Swainson had to embark for Brazil on his own resources, and instead of going straight to Rio de Janeiro, as every other naturalist did at that time, he landed first in Recife, Pernambuco (SC-25, 35-8d), where he arrived at the end of 1816. The Province of Pernambuco was almost entirely unknown from the natural sciences point of view, and had only been

explored by Marcgrave and Piso, during the Dutch invasion of Brazil in the 17th century.

As soon as Swainson had obtained a reasonable idea of the climate and of the inhabitants, he decided to proceed to the interior of the Province, when the revolution of 6 March 1817, of which he was an eye witness, cut short his plans. His collecting parties were limited to the neighborhood of Recife. As the revolution ended, the naturalist gathered all his collections and drawings, and sent them to England.

Swainson finally left Recife on July 1817, and entered the 'caatingas' (semi-arid, xerophytic formations), in a period of severe drought. He had to drink the scanty water accumulated in boulders (matacões), sometimes in a state of decomposition. Arriving at Penedo (now in the State of Alagoas; SC-24, 37-10d), in the beginning of August, he hired a canoe, and ascended the *Rio São Francisco* for a while, and then went to Salvador, Bahia (SD-24, 38-13c).

In Salvador he met the Prussian naturalists Sellow and Freyreiss, who had come from Rio de Janeiro overland. Swainson collected around Salvador, sailed through the *Baía de Todos os Santos* and left the city to enter once more the interior (sertão). He explored several localities in the interior of Bahia (of which apparently no record was left), obtaining valuable collections.

On April 1818 he returned to Salvador, sailing then to Rio de Janeiro, with the idea of comparing the southern regions of Brazil with those he had already explored. In Rio he met the Austrian, French, Russian, and Tuscanese naturalists who had come with Archduchess Leopoldina (see Chapter V).

With Giuseppe Raddi he explored the forests of the Serra dos Órgãos (SF-23, 42-22c, 43-22d) and other districts of Rio. Baron von Langsdorff helped him in every possible way and facilitated the shipment of collections to England. Swainson arrived to England in August 1818.

During his wanderings he had gathered 760 specimens of birds, 20,000 insects, 120 fishes (of which he also made drawings), several seeds and plants which were sent to the Kew Gardens and other botanical gardens, and a herbarium with 1,200 species.

From 1820 to 1855 he became established in New Zealand, with all his family, and there he died. In New Zealand he wrote his several books, among which are 'Zoological Illustrations' (1820), 'Exotic Conchology' (1821), 'Naturalist's Guide to Ornithological Drawings' (1834-41), the 'Natural History and Classification of Birds' (1836), and his very rare book on the 'Birds of Brazil' (Carvalho, 1918; Garcia, 1922; Enc.).

### L. Guilding

The Rev. LANSDOWN GUILDING was born in Kingstown, St. Vincent, West Indies, in 1797. He studied at Oxford, and collected in St. Vincent from his return in 1817 to his death (probably in Jamaica) on 22 October 1831 (Urban, 1904 : 53).

### H. Cuming

HUGH CUMING was born on 14 February 1791, in the village of Washbrook, Dodebrooke parish, near Kingsbridge, South Devon, one of the three children born to Richard and Mary Cuming. As a boy he became acquainted with Colonel George Montagu, and under his guidance he developed a taste for conchological pursuits. His parents, who were of humble stock, apprenticed him to a sailmaker; and having learned his trade an opening was found for him in South America. He left England in 1819 and settled for a short time in Buenos Aires, where presumably he made sails and where undoubtedly he collected shells.

In January 1822 Cuming settled in Valparaiso (SI-19, 37-72d), Chile, a port then much frequented by British ships, and from the time of his arrival he spent his leisure hours collecting natural objects, especially molluscs, from the docks and inlets of Valparaiso Bay. By 1825 Cuming had not only amassed a sizable collection, but he had also acquired a mistress, Maria de los Santos, and she presented him with a daughter, Clara Valentina, and a son, Hugh Valentine.

In 1826, when only thirty-five years old, Cuming retired from business. He must have been a very industrious sailmaker, for he was able to live comfortably on the proceeds of his industry till the end of his days, though his competent dealing in natural history in later years also brought him considerable income.

Cuming's retirement was purely nominal. He built himself a yacht, the 'Discoverer', fitted it up expressly for the convenience of collecting and storing natural history objects, engaged a Captain Grimwood as master, and on 28 October 1827 set sail on the first of his three collecting expeditions. This took him, by way of Juan Fernandez, Easter Islands, and many islands of Polynesia, as far as Tahiti. He returned to Valparaiso on 28 June 1828.

After spending the few next months putting his collections in order, Cuming prepared for another voyage, this time along the west coast of South America. His Pacific voyages and his

studies in natural history had made him a familiar and widely respected figure in Chile; and when it became known that he was preparing for a collecting voyage which would take him along their own west coast and other coasts contiguous to it, the Chilean authorities granted him the privilege of anchoring in the different ports free of charges and of purchasing stores free of duty. In addition he was given letters of introduction to the authorities of other countries which made it obvious to them that his activities had no political implications.

This trip lasted from 1828 to 1830, and Cuming collected in the Chilean coastal towns of Coquimbo (SH-19, 30-71a), Copiapo (SG-19, 27-70c), Iquique (SF-19, 20-70c), and Arica (SE-19, 18-70c), besides many smaller localities inland on the western slopes of the Andes. He also visited the Peruvian coastal towns of Illo (SE-19, 18-71a), Cerro Azul (SD-18, 13-76c), Lima (SD-18, 12-77c), Huacho (SC-18, 11-78d), Trujillo (SC-17, 8-79c), Pacasmayo (?), Lambayeque (SB-17, 7-80b), Paita (SB-17, 5-81c) and Tumbes (SA-17, 4-80a), as well as some places further inland; various localities in Ecuador, including several in the Bay of Guayaquil (SA-17, 2-80d), Santa Elena (SA-17, 2-81d), "Xipixapi" (Jipijapa, SA-17, 1-81d), "Bay of Caracas" (*Bahía de Caráquez*, SA-17, 1-80a), Atacames (NA-17, 1-80d), Esmeraldas (NA-17, 1-80d), and some localities in the interior; the coast town of Tumaco (NA-17, 2-79d) in Colombia, and places inland; Panama, where he made a considerable collection of marine and non-marine shells in the Gulf of Panama (NC-17, 8-79c), the Pearl Islands (NC-17, 8-79a), and the Gulf of Chiriquí (NC-17, 8-82a); numerous localities in Central America, including Puntarenas (NC-16, 10-85d), in Costa Rica, "Real Llejos" (Corinto, ND-16, 12-87a) in Nicaragua, and the Gulf of Fonseca (ND-16, 13-88b), in Honduras. He visited the Galápagos Islands; on the authority of Darwin, who visited the island group two or three years afterwards, Cuming was on Charles, James, and Albemarle Islands (Santa Cruz, San Salvador, and Isabella).

Once again he returned to Valparaiso with a great accumulation of animals and plants, molluscs comprising the largest part.

Having put his collections in order, he left Valparaiso in May, 1831, and returned to England. He took up residence in London, and before long made the acquaintance of several leading British zoologists and botanists.

On 1 May 1832 Cuming was recognized by the Linnean Society of London as Fellow. He repaid this honor donating collections of animals and plants to the Society's museum.

Late in 1834 Cuming began to entertain the idea of a collecting voyage to the Philippine Islands, for which he embarked on 15 January 1836. He returned to London on 5 June 1840, remaining there until his death in 1865 (Dance, 1966 : 146-170).

### W. J. Burchell

WILLIAM JOHN BURCHELL, the eldest son of a nurseryman at Fulham, was born about the year 1782. He received an excellent education — he wrote Latin with facility and was deeply versed in a number of sciences. Burchell was also an accomplished artist and musician. In 1805, when he was about twenty-three, he was appointed "schoolmaster and acting botanist" at St. Helena, by the East India Company, and remained on the island for five years, until his departure for Cape Town in order to begin his South African travels. He was elected a fellow of the Linnean Society on 15 February 1808.

The romance of his life came to an end on St. Helena : his father had disapproved his engagement to a lady in Fulham, and had, perhaps, obtained the appointment on St. Helena, hoping that everything might be forgotten. But the two still corresponded, and Burchell persuaded the lady to come out and join him on the island. During the voyage someone on the ship — it is said, the Captain — fell in love with her and married her. This must have been a shock to Burchell, and drove him to natural history.

From 1810 to 1815 he explored South Africa. The first part of his travels, discoveries, and observations, are described in his "Southern Africa" (Vol. 1, 1822; Vol. 2, 1824; London) covering the period between the landing in Cape Town on 2 November 1810, and his departure from Litakun on 3 August 1812. The fine collection of insects which he made in St. Helena and South Africa were almost destroyed by neglect, probably during his absence in Brazil (1825-30), but hundreds of species can be named from the fragments preserved in the Oxford Museum.

For the next ten years Burchell remained in England, and then decided to go on an expedition to Brazil. He never published an account of his results nor the notes taken during the travels. However, from the manuscripts preserved in the library of the Hope Department of Entomology, Oxford University, England — "Catalogus Entomologiae", and "Index to the localities of the plants in the Brazilian herbarium", we can have a very detailed itinerary. His "Catalogus Entomologiae" contains many

interesting references to the habits, biology, and colors of insects, their common names, and sometimes medical or other properties, taught to Burchell by the natives.

Leaving Fulham on 10 March 1825 Burchell sailed from Portsmouth on 15 March. He spent two months in Lisbon, collecting in the neighborhood, and after touching Madeira (29 May) and Teneriffe (1 June), landed in Rio de Janeiro on 18 July.

In Rio he took lodgings at the O'Brien's Hotel, Rua do Ouvidor, then one of the most fashionable streets of the City. There he received insects from friends, acquired specimens from negroes, and collected in the several districts of the Capital (Mata-porcos, Aqueduto, *Lagoa Rodrigo de Freitas*, Nossa Senhora do Livramento [English burial ground], Morro do Castelo, Botafogo, etc.).

From 26 to 30 August 1825 he visited Farm Mandioca, the well-known property of the Russian Consul, Baron von Langsdorff.

"While in Rio", he wrote, "I made some drawings of landscapes, among which a panorama taken from a hill in the middle of the city; many astronomical, philosophical, and geometrical observations."

Leaving Rio again on 7 October 1825 he went to Porto Estrela, Cebolas (11 October, 1825; ?), crossed the *Rio Paraíba* (12 October), and passed to Minas Gerais, staying at a small village called Descoberto (SF-23, 43-21d), from 15 to 24 October, where he collected, leaving then for São João Nepomuceno (SF-23, 43-22a; 27 October), and Sumidouro (SF-23, 44-17d; 10 November 1825), the end of his trip.

On 6 December 1825 he was back to Rio, visiting then the districts of Aqueduto, Catumbi, Barra Vermelha, Rio Comprido, Laranjeiras, Catete, Flamengo, Praia Grande, São João do Cará, São Cristóvão, Engenho Velho, Morro da Ladeira and Frechal.

After staying two months in Rio, Burchell left the city once more, going to the *Rio Paquequer* (SF-23, 43-22d), in the Serra dos Órgãos, on 7 February 1826. There he remained until the 24th, and the next day went to Magé (SF-23, 43-23a), where he stayed until 22 March 1826, returning to Rio, and again collecting in the districts of Catete, Botafogo, Tijuca, etc.

Burchell remained in Rio until September 1826, and then decided to undertake his long journey to the north of the country.

On 10 September 1826 he quitted Rio and sailed to Santos, in the State of São Paulo, where he remained two months (12 September to 2 December 1826), and then proceeded to Cubatão (SF-23, 46-24a), at the foot of the Serra do Mar, taking up his

station in a solitary hut in the midst of the forests, for the purpose of exploring them at leisure. The hut belonged to a certain Mr. Eric Smith.

On 17 January 1827 he left Cubatão, going up the Serra do Mar, and arrived at São Bernardo (SF-23, 46-24a). From 20 January to 24 July 1827, he remained in São Paulo, extending his excursions in various directions (Convento da Luz, Rio Tietê, Estrada de Santo Amaro, Água Branca, Morumbi, Rio Pinheiros, Várzea do Carmo, Convento de São Bento, Juqueri, and Estrada do Rio). Having then purchased a troop of mules and engaged the necessary muleteers, he travelled to the north, according to the following itinerary (extracted from Burchell, MS 1, MS 2) :

1827

August

1. Jundiaí (SF-23, 47-23d), Capivari (SF-23, 48-23b)
3. Campinas (SF-23, 47-23a), Bocaiúva (?), Restinga (?)
11. Mogi Mirim (SF-23, 47-22d)
19. Oriçanga (SF-23, 47-22c; also spelled Orissanga)
20. Rio Itupeva (SF-23, 47-23c)
21. Cocais (SF-23, 47-22b)
22. Tambaú (SF-23, 47-22a)
23. Olaria (?)
25. Rio Pardo (SF-23, 47-22a)
26. Rio Cubatão (SF-23, 47-21c)
27. "Retiro" (in this and other occasions Burchell refers to a winter pasture, where cattle is maintained during certain parts of the year, generally with an isolated hut, where travellers could stay)
28. Servo (Cervo) (?)
29. Ribeirão da Paciência (SF-23, 47-21a)
30. Veravinha (?)

September

1. Franca (SF-23, 47-21a)
5. Cachoeira (?)
6. Buriti (Buritzal; SF-23, 48-20d)
7. "Retiro"

8. *Rio Grande* (SF-23, 47-20c, 48-20d; crossing the *Rio Grande*  
Burchell entered the State of Minas Gerais)
9. Tenente (?)
10. Farinha Podre (?)
11. Sanhosó (?)
12. Tijuco (?)
13. Verava Legitima (Uberaba; SE-23, 48-20b)
14. *Rio da Velhas* (or *Araguari*, SE-23, 48-19d)
15. *Ribeirão das Furnas* (SE-23, 48-19b)
17. *Ribeirão do Piçarrão* (SE-23, 48-19b)
19. *Ribeirão São Domingos* (SE-23, 48-18d)
20. *Rio Paranaíba*, Borda do Mato (SE-23, 48-18d; here  
Burchell passed to the State of Goiás)
22. Riacho (?)
23. Catalão (SE-23, 48-18d)
24. Pé do Morro (?)
25. *Rio Veríssimo* (SE-23; 48-18b)
26. *Braço do Veríssimo* (*Rio do Braço*; SE-23, 48-17d)
27. *Ribeirão das Lajes* (SE-23, 48-17b)
28. Palmital (?)
29. Pé da Rocha (?)
30. *Rio Corumbá* (SE-23, 48-17b)

*October*

2. Brejo (?)
3. Miguel Ribeiro or Baú (?)
4. Campo Aberto (?)
5. "Basil" (Vazio) (?)
- 6-7. Bonfim (Bonfinópolis; SE-22, 49-17b)
8. *Rio Piracanjuba* (SE-22, 48-17a)
9. As Antas (?)
10. Forquilho (?)
11. Forma (?)
12. *Rio Meia Ponte* (SE-22, 49-17a)
23. Caiçara (?)
24. Joaquim Alves (?)
28. Sapezal (?)
30. Conceição (?)
31. *Córrego Campo Alegre* (SE-22, 50-16d)

November

1. *Rio Uru* (SE-22, 50-16b)
2. Goiás (SD-22, 50-16a); "being the first and only Englishman who has entered that Province. There I passed the rainy season of 1828 and made large collections, being detained by nine months, owing chiefly to the difficulty of finding the means of conveyance for my baggage." From Goiás Burchell went to several nearby areas.
18. *Rio Manuel Nunes* (?)
28. Caminho do Ferreiro (road towards the *Rio Vermelho*; SD-22, 50-16a; now there is a State road, GO-62)

1828

February

5. Carioca (?)
11. *Rio Bagagem* (SD-22, 48-14c)
21. Forca (?)

March

3. "The town by the *Rio Vermelho*" (*Rio Vermelho*, runs near the city of Goiás)
16. "Sítio do Zacaria" (?)

April

3. Caminho do Bacopari (?)
16. Morro do Cantagalo (?)

June

15. Goiás to *Rio Bacalhau* (SD-22, 48-14c)
- 22-26. Rio de *Manuel Gomes* (?)

July

8. Santo Amaro Church (?)
22. Goiás (until 22 August, when he started on his trip to the north)

## August

22. From *R. Uru* (SD-22, 50-16b) to *Rio das Pedras* (?)
23. Road to "Retiro"
24. "Retiro"
25. Goiabeira (?)
28. Jaraguá (SD-22, 49-16a)
29. *Rio Bonifácio* (?)
30. Estiva (?)
31. Capão de São João (?)

## September

1. *Ribeirão dos Macacos* (near Macacos, SD-22, 48-16a)
2. Olhos d'Água (?)
3. Bom Jesus (?)
4. Fazenda Seca (?)
5. *Rio Maranhão* (SD-22, 49-15b)
7. Guarda-Mor (?)
9. *Ribeirão de São João* (?)
10. *Rio Vendinha* (?)
11. *Rio Traíras* (SD-22, 48-15a)
15. São José (?)
17. *Rio Bagagem* (SD-22, 48-15a, 48-14c)
18. *Ribeirão da Serra* (SD-22, 48-14c)
19. *Rio Tocantins* (SD-22, 49-14d)
21. *Ribeirão do Padre* (?)
22. *Rio Preto* (SD-23, 48-14b)
23. As Lajes (?)
24. *Ribeirão Moquém* (SD-23, 48-14b)
25. As Araras (?)
26. Cavalcante (SD-23, 48-14b)

## October

3. *Rio Gambá* (?)
4. *Rio do Sobrado* (*Rio dos Bois*; SD-23, 47-14a)
6. *Rio Paraná* (SD-23, 48-13d; 48-13b)
8. Talaia (Atalaia) (?)
9. *Rio Bezerra* (SD-23, 47-13c)
10. Chupateiro (?)
11. *Rio Arraias* (?)
13. Córrego Rico (?)

14. *Sapé* (?)
15. *Santa Brígida* (?)
16. *Rio Palma* (SD-23, 48-12d; 47-12c)
- 18-21. Arraial da Conceição (Conceição do Norte; SD-23, 47-12c)
24. Barracão (?)
25. São Bento (?)
26. *Rio Cantagalo* (?)
27. *Rio Manuel Alves* (or *Manuel Alves da Natividade*; SC-23, 48-12b; SC-22, 48-12a)
28. *Rio Salobro* (SC-23, 48-12b)
29. Natividade (SC-23, 48-12b)

November

2. Chagada (?Chapada; SC-23, 48-12b)
3. *Rio das Pedras* (?)
4. Canga (?)
6. *Cabeça de Boi* (Island; SC-22, 48-11a; from here onwards Burchell started navigation of the *Tocantins River*)
7. Passa-Três (?)
8. *Córrego Raiz* (?)
9. Carmo (?)
12. *Córrego Fundo* (?)
13. Porto Real (now Porto Nacional; SC-22, 49-11a). "Here I remained till the proper season for embarking, and descending the stream, at all times rendered dangerous by numerous rocky falls, rapids, and whirlpools, I made considerable collections on ground over which no scientific traveller had ever passed. I completed a survey of the whole length of this voyage, fixed by numerous astronomical observations."

1829

April

28. *Porto do Ferreiro* (?)
30. *Rio São João* (SC-22, 48-10c)

## May

1. Graciosa (?); *Pilões* (*Cachoeira dos*; SC-22, 48-10a)
2. Mares (?)
3. Sagrado (?); *Funil* (*Cachoeira do*; SC-22, 48-10a)
8. Leopoldina (?)
9. Alcântara (?)
10. Sobradinho (?)
12. Santa Maria (?); Três Barras (?)
13. Carolina (SB-23, 47-7c)
14. Santo Antônio (*Cachoeira*; SB-23, 47-6a)
19. Araguaia (São João do Araguaia; SB-22, 49-6a; in this point Burchell entered the *River Araguaia*, in the State of Pará; he continued his trip up the *Tocantins*)
21. Itauri, Canal de Araraquara (?)
23. Itaboca (?)
25. *Guariba Falls* (?)
27. Arroios (?)
30. Praia do Espírito Santo (?)
31. Baião (SA-22, 50-3b)

## June

2. Sítio das Pedras (?)
7. Santa Ana (?)
8. Burchell left the Tocantins, entering the *Rio Moju* (SA-22, 49-2b) to reach the city of Belém
9. Jaguari (Jaguarari; SA-22, 48-2a)
26. "Pará" (Belém; SA-22, 49-1d). "While waiting till February [I] added largely to my collections both in zoology and botany. On this city I made a panorama, which, with that of Rio, I hope perhaps to succeed in getting graved, together with landscapes, &c. Of insects I found from 16 to 20 thousand specimens (at a guess). Of birds I shot and preserved 362 species. In the other classes a proportionally smaller number."

Sailing from Belém, Burchell landed in Dover on 24 March 1830, and soon reached his home in Fulham. He was conferred the degree of D.C.L. Honoris Causa, by the University of Oxford, on 8 May 1834. There is no doubt that Burchell expected a government pension and that he bitterly resented what he regarded as undeserved neglect. He committed suicide on 23 March 1863, in his 80th year.

Burchell's collections were not especially mentioned in his will (dated 2 March 1841). Upon his death, in 1863, they came into the possession of his sister, Miss Anna Burchell, who offered the whole of them to the University of Oxford in the following year, upon the condition "that separate rooms shall be apart for them, and that the whole be put out, set up, and systematically arranged, and be called 'the Burchell Collection' or presented to the Museum by Wm. J. Burchell, Esq., D.C.L.". The Delegates of the Museum were unable to accept these conditions. A few months later, Miss Burchell wrote (8 April 1865) : "I am still desirous, in accordance with what I believe to have been his (Burchell's) wish, of presenting the same (collections of zoology and entomology) to the University of Oxford." The only condition now was "that the collections should be distinguished as those of my late brother." The offer was gratefully accepted and in a few weeks the collections were in the Museum (Burchell, MS 1 and MS 2; Poulton, 1904).

### King and Fitz Roy

In the beginning of the 19th century sealers and whalers were using the seas around Cape Horn and sometimes getting shipwrecked on these shores. The British Navy, at the height of its prestige, felt it its duty to establish a proper survey and to present her findings "for the benefit of the other nations of the world".

A series of expeditions was set out to the Magellan Straits, with the purpose of obtaining scientific observations. On the first expedition Captain PHILIP PARKER KING was in command. King was born in the island of Norfolk in 1793, and died in Sydney, Australia, in 1855. He entered the navy very young, being known by his energy and intrepidity. He became lieutenant in 1817 and was charged with making a survey of the Australian coasts. This hydrographical work lasted for four years. In 1822 he returned to England, was promoted to Captain, and the Royal Society received him among its fellows.

In 1826 King was assigned by the Government to do a survey of the coasts of South America, from the Rio de La Plata mouth to the island of Chiloé.

On the 22nd of May, 1826, from the port of Plymouth, sailed the 'Adventure' and the 'Beagle', destined to a hydrographical survey of the Magellan Straits, commanded by Captain King. The

ships touched Madeira, Teneriffe, and St. Jago, arriving in Rio de Janeiro on 10 August 1826. There they remained until the 12th of October, sailing to Maldonado (SI-21, 35-55b) in Uruguay, and then to Montevideo (SI-21, 35-56a).

Sailing from Montevideo on 19 November 1826, and heading to the south, the ships touched Port Santa Elena (SL-19, 45-65a; 5 December), Cape Fairweather, Cape Virgins (Cabo de las Virgenes; SN-19, 52-68c), Cape Possession, Gregory Bay, Elizabeth Island (SN-19, 54-73c), Port Famine, and several other places around the Straits of Magellan, where the hydrographic surveys were being made.

On 24 April 1827 they returned to Montevideo. Sailing again from that port on 16 September on the way to Rio, the ships landed in Santos (SF-23, 46-24a), in the State of São Paulo on 18 May. Captain King landed, went up the Serra do Mar, and reached the city of São Paulo (SF-23, 47-24b), in order to make some barometrical observations, and there he collected some insects.

On the return trip from Rio de Janeiro, they landed in Santa Catarina for 8 days, and returned once more to Montevideo, sailing again on 23 December for another survey voyage of the Straits (King, 1839).

In October 1828 Captain King sailed into the Rio harbor and reported to Admiral Otway. He had lost his captain of the 'Beagle' under tragic circumstances and sought permission to appoint to the ship's command the lieutenant who had taken over from the dead man. Admiral Otway ordered otherwise. He appointed lieutenant Fitz Roy to the command of the 'Beagle'.

ROBERT FITZ ROY was born on 5 July 1805 in Hampton Hall, near Euston, Suffolk. When Robert was four the family moved to occupy the 'hunting lodge' of the Grafton family, Wakefield Lodge, near the village of Pottersbury. Robert only enjoyed the company of his mother for one year at Wakefield Lodge. In 1810 she died. With, therefore, a country gentleman father who had lost his second wife, with an elder brother and sister, and a half-brother who was eight years his senior, Robert grew up. In February 1818, just eight years after his mother's death, and while he was not yet thirteen years old, he entered the Royal Naval College at Portsmouth.

He took 10 years of training, passing through the ranks of Volunteer-per-order, College Volunteer, Midshipman, Lieutenant, and Flag Lieutenant. He served as volunteer on board the 'Owen Glendowen' and as a midshipman on the 'Hind'. In the autumn of 1824 he served as midshipman on the 'Thetis'.

In April 1828 the 'Thetis' was sent to Montevideo under the command of Admiral Sir Robert Otway. Fitz Roy caused a great impression on Otway, as less than 3 months later he was given his great chance. At that time Fitz Roy was Flag Lieutenant on board the 'Ganges'. In Rio he was transferred to the 'Beagle' as Captain.

In 1829 he undertook his first voyage as captain of the 'Beagle', accompanying King in the 'Adventure', and the supplementary schooner, the 'Adelaide'. He went through the Straits of Magellan to the island of Chilcén. There, on 18 November 1829, he received his order for his second and last trip of the surveying expedition. He explored with great success the southern tip of South America and finally joined Captain King in the Rio harbor on 6 August 1830.

On board the 'Beagle' Fitz Roy had brought four natives from Tierra del Fuego, York Minster (26), Boat Memory (20), James Button (14), and Fuegia Basket (9).

In a letter addressed to King (12 September 1830) he explained the reason for bringing alone these natives:

*"When about to depart from the Fuegian coast, I decided to keep those four natives on board, for they appeared to be quite cheerful and contented with their situation; and I thought that many good effects might be the consequence of their living a short time in England. They have lived, and have been clothed like the seamen, and are now, and have been always, in excellent health and very happy. They understand why they were taken, and look forward with pleasure to seeing our country, as well as returning to their own."*

*"Should not His Majesty's Government direct otherwise, I shall procure for these people a suitable education and, after two or three years, shall send or take them back to their country, with as large a stock as I can collect of those articles most useful to them, and most likely to improve the condition of their countrymen, who are scarcely superior to the brute creation [sic]."*

The 'Beagle' finally berthed in Plymouth, and the four natives landed there, being transferred to a nearby farmhouse. Boat Memory contracted smallpox, however, and the four were interned in the Plymouth Royal Naval Hospital, where Boat Memory died.

Afterwards they were sent to Walthamstow, where the Rector, William Wilson, would take care of their "education" — "English, the plainer truths of Christianity, as the first object; and the use of common tools, a slight acquaintance with husbandry, gardening, and mechanisms, as the second."

In the summer of 1831 came the summons to Fitz Roy to show his Fuegians to the King and Queen. The audience was an obvious success.

Fourteen months passed, and Fitz Roy was becoming restive, and wanted to return the Fuegians to their native land. In a letter to the Admiralty, he said: "Having been led to suppose that a vessel would be sent to South America to continue the survey, I hoped to have seen these people become useful as interpreters, and be the means of establishing a friendly disposition towards Englishmen on the part of their countrymen, if not a regular intercourse with them. By supplying these natives with some animals, seeds, tools, etc., and placing them, with some of their own tribe, on the fertile land lying on the east side of Tierra del Fuego, I thought that in a few years, ships might have been enabled to obtain fresh provisions, as well as wood and water, during their passage from the Atlantic to the Pacific Ocean, on a part of the coast which can always be approached with ease and safety." Then came the specific request. If their Lordships did not think his ideas worthy of attention and support then might he please have twelve months' leave of absence in order to "keep faith" with the natives of Tierra del Fuego.

The leave of absence was granted.

Fitz Roy lost no time in chartering a vessel as his own expense to take him and the Fuegians. He had determined to go himself, he explained, because he felt he could not trust anyone else to go to the necessary trouble of landing the natives amongst their own tribes and at the spots from which they had been taken. A formal agreement was drawn up and signed, and the fee that Fitz Roy agreed to pay out of his own pocket was a thousand pounds.

However, a "kind uncle" came to Fitz Roy's rescue, either the Fourth Duke of Grafton, or more probably Lord Londonderry, who persuaded the Admiralty to send Fitz Roy on another South American surveying voyage forthwith. This reversal of decision did not come however until Fitz Roy had signed the agreement with the merchant shipowner, and he had paid the "larger part" of the thousand pounds. He was also left with a number of goats on his hands, purchased for the "purpose of stocking some of the islands of Tierra del Fuego".

On 27 June 1831 Fitz Roy was reappointed to his little vessel, the Beagle.

In August the Admiralty was receiving another letter, this time, however, from the Rector of Walthamstow, Mr. Wilson.

He thought it would be a good idea if two missionaries should accompany the natives back to Tierra del Fuego. Would the Navy and Fitz Roy be willing to take them; would perhaps the Government allow them to be maintained on board at public expenses; would Fitz Roy even be so good as to visit them again to see how they were getting on after they had been landed? "A subscription has been set on foot by gentlemen who are extremely desirous that this opportunity should not be lost; and, in consequence of their united wishes, I now take the liberty of making these questions."

The answers were all most obligingly affirmative. Only one volunteer for the contemplated two missionary posts could, however, be found — a young "catechist" by the name of Richard Matthews.

In October, the various things which the families at Walthamstow and other "kind-hearted persons" had given, were transported to the Beagle:

"The choice of articles", said Darwin, "showed the most culpable folly and négligency. Wine glasses, butter-bolts, tea-trays, soup tureens, mahogany dressing case, fine white linen, beaver hats and an endless variety of similar things, show how little was thought about the country where they were going to. The means absolutely wasted on such things would have purchased an immense stock of really useful articles."

According to Fitz Roy's wishes, also a naturalist should accompany this surveying voyage. After many troubles and hesitations, Charles Darwin was appointed, and the new voyage of the Beagle resulted in the greatest contribution ever made to the natural sciences, as we shall see in the forthcoming section (Mellersh, 1968).

### Darwin

CHARLES ROBERT DARWIN was the second son of Dr. Robert Waring Darwin, of Shrewsbury, where he was born on 12 February 1809. Dr. Darwin was the son of Erasmus Darwin, a poet, physician, and naturalist. Charles Darwin's mother was Susannah, daughter of Josiah Wedgwood. Darwin's mother died in July 1817, when he was a little over eight years old. In the spring of this same year Charles was sent to a day-school in Shrewsbury, where he stayed a year. By that time his taste for natural history, and more especially for collecting, was well developed. He tried to make out the names of plants, and collected all sorts of things,

shells, seals, franks, coins, and minerals. As Darwin states: "the passion for collecting which leads a man to be a systematic naturalist, a virtuoso or a miser, was very strong in me, and was clearly innate, as none of my sisters or brother ever had this taste."

In the summer of 1818 he went to Dr. Butler's great school in Shrewsbury, and remained there for seven years till Midsummer 1825, when he was sixteen years old. Early in his school-days a boy had a copy of the 'Wonders of the World', which Darwin often read, and disputed with other boys about the veracity of some of the statements. Darwin believed that this book first gave him a wish to travel in remote countries, which was ultimately fulfilled by the voyage of the 'Beagle'.

He also continued collecting minerals and insects, and watching the habits of birds. With his brother, who had a chemical laboratory in the tool-house in the garden, he practiced chemistry, and learned the "meaning of experimental science." The fact that they worked at chemistry somehow got known at school and Charles was nicknamed "gas".

As he was not doing well at school, his father took him away at a rather earlier age than usual, and sent him (October 1825) to Edinburgh University with his brother, where he stayed for two years or sessions. As Darwin became convinced "from various circumstances that [his] father would leave [him] property enough to subsist on with some comfort, though [he] never imagined that [he] should be so rich a man, [his] belief was sufficient to check any strenuous effort to learn medicine."

A negro living in Edinburgh, who had travelled with Waterton, gained his livelihood by stuffing birds, and gave lessons to Darwin for payment, and he used often to sit with him.

Darwin's father had perceived, or heard Darwin's sisters, that Charles did not like the thought of being a physician, so he proposed that his son become a clergyman. As Darwin had forgotten, in the two years at Edinburgh, almost everything he had learned of the classics, he had to work with a private tutor in Shrewsbury, and went to Cambridge after the Christmas vacation, early in 1828. He soon recovered his school standards of knowledge, and could translate some Greek books, such as Homer and the Greek Testament, with moderate facility.

During the three years which he spent at Cambridge, his time was wasted, as far as the academical studies were concerned, as completely as at Edinburgh and at school. His second cousin, W. Darwin Fox, who was then at Christ's College, introduced



Jaguar hunting in a forest (Rugendas)



him to entomology. Also in Cambridge he became acquainted with Professor Henslow, with whom once every week all undergraduates and some older members of the University, who were attached to science, used to meet in the evening. During his last year at Cambridge, Darwin read with care and profound interest Humboldt's 'Personal Narrative'. This work, and Sir J. Herschel's 'Introduction to the Study of Natural Philosophy', stirred up in him a "burning zeal to add even the most humble contribution to the noble structure of Natural Science". His summer vacations were given over to collecting beetles, to some reading, and shot tours.

As he had come up to Cambridge at Christmas, he was forced to remain two terms after passing his final examinations, at the commencement of 1831; and Henslow then persuaded him to begin the study of geology. On his return to Shrewsbury, he examined sections, and colored a set of parts around Shrewsbury. With Professor Sedgwick he made a short geological tour in North Wales.

On returning home from his short tour, he found a letter from Henslow, informing him that Captain Fitz Roy was willing to give up part of his own cabin to any young man who would volunteer to go with him without pay as naturalist to the voyage of the 'Beagle'.

According to Fitz Roy (1839: 18-19): "Anxious that no opportunity of collecting useful information, during the voyage, should be lost, I proposed to the Hydrographer that some well educated and scientific person should be sought for who would willingly share such accommodations as I had to offer, in order to profit by the opportunity of visiting distant countries yet little known. Captain Beaufort approved of the suggestion, and wrote to Professor Peacock, of Cambridge, who consulted with a friend, Professor Henslow, and he named Mr. Charles Darwin, grandson of Mr. Darwin the poet, as a young man of promising ability, extremely fond of geology, and indeed all branches of natural history. In consequence an offer was made to Mr. Darwin to be my guest on board, which he accepted conditionally; permission was obtained for his embarkation, and an order given by the Admiralty that he should be borne on the ship's books for provisions. The conditions asked by Mr. Darwin were that he should be at liberty to leave the Beagle and retire from the Expedition when he thought proper, and that he should pay a fair share of the expenses of my table..."

Darwin was extremely eager to accept Fitz Roy's offer, but his father strongly objected, adding the words "If you can find

any man of commonsense who advises you to go I will give my consent."

So Charles wrote that evening and refused the offer. On the next morning, however, his uncle Josiah Wedgwood sent for him, offering to talk with his father, as his uncle thought it would be wise in him to accept the offer. Darwin's father always maintained that his uncle was one of the most sensible men in the world, and he at once consented in the kindest manner.

Next day Charles started for Cambridge to see Henslow, and thence to London to see Fitz Roy, and all was soon arranged. On 11 September 1831 he paid a flying visit to Fitz Roy on the Beagle at Plymouth. Thence to Shrewsbury to wish his father and sisters a long farewell. On 24 October he took up his residence at Plymouth, and remained there until 27 December, when the 'Beagle' left the shores of England for the circumnavigation of the world.

The Beagle left Devonport on 27 December 1831. After passing by Teneriffe (6 January 1832) and after a short stay in St. Jago, in the Cape Verde Islands, where she arrived on 16 January, the Beagle approached the St. Paul's Rock ( $0^{\circ}58'N$ ,  $29^{\circ}15'W$ ), on 16 February. That rock is 540 miles distant from the coast of America, and 350 from the island of Fernando Noronha. There Darwin collected some Hippoboscidae "living on the booby", an acarus, which must have come as parasite on the birds, a small brown moth "belonging to a genus that feeds on feathers", a staphylinid, and a woodlouse beneath the dung; and lastly, numerous spiders.

After staying for a few hours on Fernando Noronha island (20 February 1832), the Beagle landed in the city of Salvador, State of Bahia, on 29 February. Darwin landed and started to explore the forests of the city's neighborhood. "Delight itself is a weak term", he wrote, "to express the feelings of a naturalist who, for the first time, has been wandering by himself in a Brazilian forest. Among the multitude of striking objects, the general luxuriance of grasses, the novelty of the parasitical plants, the beauty of the flowers, the glossy green of the foliage, all tend to this end. A most paradoxical mixture of sound and silence pervades the shady parts of the wood. The noise from the insects is so loud, that it may be heard even in a vessel anchored several hundred yards from the shore; yet within the recesses of the forest a universal silence appears to reign. To a person fond of natural history, such a day as this brings with it a deeper pleasure than he can ever hope again to experience."

Leaving Salvador on 18 March 1832, a few days afterwards the Beagle passed not far from the Abrolhos islets, and on 4 April landed in Rio de Janeiro. In Rio Darwin became acquainted with an Englishman who was going to visit his estate situated rather more than a hundred miles from the Capital, to the northward of Cabo Frio. Leaving the city on 8 April, the party passed through Praia Grande (nowadays Niterói, capital of the State of Rio de Janeiro; SF-23, 43-23b), Itacaia (?), and made a first stop in the Lake of Maricá (SF-23, 43-23b), leaving the next morning for Mandetiba and Campos Novos (?). On the 13th they reached a farm named "Socego", belonging to a relation of one of the party. The next day they went to another estate, near the Rio Macaé (SF-23, 42-22c). Returning to Socego on 18 April, Darwin spent two days there, collecting insects in the forest. He left the estate on the 19th, and reached Rio on the 23rd. During the remainder of his stay in Rio, Darwin resided in a cottage at Botafogo Bay, visiting several districts of the city, as the Botanical Gardens, the Gávea, etc., to collect natural history specimens.

In the morning of 5 July 1832 the Beagle left Rio, and on the 26th anchored at Montevideo. For the two succeeding years the Beagle was to be employed in surveying the extreme southern and eastern coasts of South America, south of the *La Plata Rive*.

Darwin collected then for the next ten weeks in Maldonado (SI-21, 35-55b), "in which time a nearly perfect collection of the animals, birds, and reptiles, was procured". He also visited the *Rio Polanco* (*Arroyo Polanco*; SI-21, 34-55a), the village of Las Minas (SI-21, 34-55c), and Pán de Azúcar (SI-21, 35-55a).

On 6 September 1832 the Beagle arrived to *Bahia Blanca* (SJ-20, 39-62d), in Argentina, and returned again to *Rio de La Plata* on 3 October, remaining there until the 16th of December, when she sailed for *Tierra del Fuego*. On 17 December 1832, a little after noon, they doubled Cape San Diego (SN-19, 55-65a) and entered the Strait of Le Maire, anchoring in the afternoon in the *Bay of Good Success* (*Bahia Buen Suceso*; SN-19, 55-65a). There they came in contact with the Fuegians. On the 20th Darwin made an excursion to the summit of a mountain about 1500 feet high, called by Fitz Roy after Sir Joseph Banks, in commemoration of his disastrous excursion, which proved fatal to two of his party, and nearly so to Dr. Solander (see Vol. I, p. 17). On the 21st the Beagle left that place, and after an arduous crossing of Cape Horn, on 15 January 1833 anchored in Goeree Roads (?). Four boats were then equipped to settle the Fuegians, according to their wishes, in Ponsonby Sound, through the Beagle

*Channel* (SN-19, 55-68a). On 19 January, the three whale-boats and the yawl, with a party of 28, started under the command of Fitz Roy. On the 22nd they reached the junction of Ponsonby Sound with the Beagle Channel. The next day Jimmy Button was left ashore where he expected to find his mother and relatives. The party from the 'Beagle' waited there for five days.

On 6 February 1833 they arrived at Woollya, where the natives were left ashore. Rev. Matthews gave so bad an account of the conduct of the Fuegians, that Captain Fitz Roy determined to take him back to the Beagle; and ultimately he was left at New Zealand, where his brother was a missionary.

Darwin wrote that it was "quite melancholy leaving the three Fuegians with their savage countrymen; but it was a great comfort that they had no personal fears. York, being a powerful resolute man, was pretty sure to get on well, together with his wife Fuegia. Poor Jemmy looked rather disconsolate, and would then, I have little doubt, have been glad to have returned with us (...) Our three Fuegians, though they had been only three years with civilized men, would, I am sure, have been glad to have retained their new habits, but this was obviously impossible. I fear it is more than doubtful, whether their visit will have been of any use to them..."

In the evening of the 6th, with Matthews on board, the Beagle left those parts, and still proceeded to survey the *Beagle Channel*. On the 5th of March they visited Wollya again, and saw Jemmy Button, and his recently acquired wife, and shaked hands with him for the last time.

From then on, the Beagle continued the survey of the Magellan Strait, and went back once more to Maldonado, in Uruguay.

The Beagle sailed once more from Maldonado, on 24 July 1833, and arrived off the mouth of the *Rio Negro* (SK-20, 40-64d) on 3 August. Darwin landed, and went to Carmen de Patagones (SK-20, 41-63b), 18 miles up the river, and stayed collecting in the neighborhood. On 11 August, with an Englishman residing at Carmen, a guide, and five "gauchos", Darwin went overland to Punta Alta, in *Bahia Blanca* (SJ-20, 39-62d), where he stayed until the 24th of August, when the Beagle arrived. A week afterwards the Beagle was to sail back to the *Plata*. With Fitz Roy's consent, Darwin was left behind, to travel by land to Buenos Aires. He remained in *Bahia Blanca* making observations, studying fossils, until 8 September. Then, with a "gaucho", started the trip of 400 miles to the Capital, passing through *Rio*

Sauce, Sierra de la Ventana (SK-19, 42-66a), Sierra Tapalguen (Tapalqué; SJ-20, 36-60c; 16 September), Río Tapalguen (Arroyo Tapalqué; SJ-20, 37-60a), Guardia del Monte (19 September), and arriving in Buenos Aires (SI-21, 35-58a) on the 20th.

On 27 September 1833 Darwin decided to go to Santa Fé, 300 miles from Buenos Aires, on the banks of the Paraná River. Through Luján (SI-21, 35-59a; 28 September), Río Arrecife (Arroyo Arrecife; SI-21, 33-59a), and San Nicolás (SI-20, 33-60c; 29-30 September), he reached the Paraná, which he followed by way of Rosário (SI-20, 33-61b), the mouth of the Río Tercero (1 October), and Lake Coronda (SI-20, 32-61d; 2 October), until Santa Fé (SH-20, 32-61b; 3 October). Two days afterwards he crossed the Paraná, to Santa Fé Bajada, a town on the opposite shore. On 12 October he returned by a one-masted vessel to Buenos Aires, where he arrived on the 20th. Crossing the Plata he landed in Montevideo.

On arriving at Montevideo, Darwin learned that the Beagle would not sail for some time, so he prepared a short excursion to Colonia. Leaving the Capital on 14 November 1833, he spent the night in Canelones (SI-21, 35-56a), and the next day passed by boat the streams of Canelones, Santa Lucía, and San José; on the 16th, crossing the Cufré, arrived at the village of Cufré (SI-21, 34-57c). On the 17th he crossed the Rosario, and passing the village of Colla (SI-21, 34-57c), arrived at mid-day at Colonia (del Sacramento; SI-21, 34-58d). The following day he rode with his host to an 'estancia' at the Arroyo de San Juan (SI-21, 34-58d), and then, passing the village of las Vacas (SI-21, 34-58a), they slept at a house of a North American, who worked a limekiln on the Arroyo de las Viboras (SI-21, 34-58a). In the morning they rode to Punta Gorda (?) and reached the Río Uruguay; in the evening they proceeded to Mercedes (SI-21, 33-58c), on the Río Negro. On 22 November 1833 they went to an 'estancia' on the Berguelo (Arroyo Berqueló; SI-21, 33-58d), belonging to an Englishman, where Darwin stayed for three days. One morning he rode to the Sierra del Pedro Flaco (?), approximately twenty miles up the Río Negro. On 26 November 1833 he set out on his return in a direct line for Montevideo.

On 6 December 1833, the Beagle sailed from the Río de la Plata, never again to enter its muddy stream. Their course was directed to Port Desire (Puerto Deseado; SI-19, 47-68c), where they arrived on 23 December. On 9 January 1834 they proceeded to Port San Julián (SM-19, 49-68d), about one

hundred and ten miles to the south of Port Desire. During March they visited the Falklands. On 13 April the Beagle anchored within the mouth of the *Santa Cruz* (SM-19, 50-69c), and a party went up the river, to explore it, until the 4th of May, when they saw at the distance the white summits of the Andes, peeping through their dusky envelope of clouds. On 5 May they commenced their descent, reaching the 'Beagle' on the 8th, after a twenty-one days' expedition.

At the end of May, 1834, the Beagle entered for a second time the eastern mouth of the Strait of Magellan, passing by Port Famine, and entering the open Pacific on 10 June. She laid anchor then in the bay of Valparaiso (SI-19, 33-71c) on 23 July 1834. The following days Darwin took several walks collecting objects of natural history. On 14 August he set out on a riding excursion, for the purpose of geologizing the basal parts of the Andes; the next day he returned through the valley of Quillota (SI-19, 33-71a), visiting several localities, to Santiago (SI-19, 33-71d), where he spent a week. On 5 September he crossed the *Maypu* (*Maipú*; SI-19, 34-71b), going to Rancagua (SI-19, 34-71d; 6 September) and Cauquenes (SI-18, 36-72a), remaining in the latter place for 5 days. Leaving then on 13 September, he went back to Valparaiso, where he arrived on the 27th.

From Valparaiso (SI-19, 33-71c), on 10 November 1834, the Beagle sailed to the southward, for the purpose of surveying the southern part of Chile, the island of Chiloé (SK-18, 42-74d; SK-19, 42-72a), and the broken land called the Chonos Archipelago (SL-18, 45-75d). On the 21st they anchored in the Bay of San Carlos (now Ancud; SK-18, 42-74d), the capital of Chiloé. Darwin visited the island, as well as the city of Castro (SK-18, 42-74d), the island of Caucahué (SK-18, 42-73c), and the island of Lemuy (Lemuy; SK-18, 43-74b; 1 December). During the four succeeding days the Beagle continued sailing southward, reaching Caylen (Cailén Island; SK-18, 43-74d) on the 6th, and the island of San Pedro (SK-18, 43-74d). On 10 December they arrived at Guayatecas, Chonos Archipelago, where they remained for three days. Cape Tres Montes (?) was reached on 30 December, and then the Beagle returned to the Chonos Archipelago, anchoring in Lowe's Harbour on 7 January 1835. They left that place on the 15th, the ship anchoring for the second time in the Bay of San Carlos (Ancud), Chiloé. On the night of the 19th the volcano of Osorno was in activity. On the 22nd Darwin rode to Castro (SK-18, 42-74d) and Cucao (SK-18, 43-74a).

The Beagle left Chiloé on 4 February 1835, going to Valdivia (SJ-18, 40-73a). Darwin visited the neighborhood of the city until the 20th, when he experienced 2 violent earthquakes. Valdivia was left on 22 February, the ship arriving at Concepción (SJ-18, 37-73b) on 4 March. After three days she sailed for Valparaíso (SI-19, 33-71c) once more, where she laid anchor on the 11th. Two days afterwards Darwin set out on an excursion to cross the Cordillera. Through the Portillo Pass he reached Mendoza (SI-19, 33-69b), in Argentina, on 27 March. On the 29th he started his trip back to Chile, by the Uspallata Pass, to the northward of Mendoza. Darwin arrived at Santiago on 10 April. A few days afterwards he reached his quarters at Valparaíso.

From Valparaíso, on 27 April, Darwin set out on a journey to Coquimbo (SH-19, 30-71a), by way of Viña del Mar (SI-19, 33-72d) and Illapel (SH-19, 32-71a; 4 May). From Coquimbo (14 May) he visited several localities, and reached Copiapó (SG-19, 20-70c; 12 June). On 2 July he heard of the Beagle's arrival in the port, and the next morning sailed for Iquique (SF-19, 20-70c; then in Peru, now belonging to Chile). The Beagle anchored in the port of Iquique on 12 July 1835, where Darwin went to visit several mines. The next 19th they were at Callao (SD-18, 12-77c), going hence to Lima (SD-18, 12-77c), and to the island of San Lorenzo (SD-18, 12-77c). From 15 September to 20 October they explored the Galápagos Islands, where so many striking facts were discovered, and where Darwin got several ideas for the future elaboration of the theory of evolution. From the Galápagos the Beagle started the long voyage to Tahiti.

After the circumnavigation of the globe, the Beagle reached for a second time Salvador, Bahia (SD-24, 13-39b), in Brazil, on 1 August 1836, 4 years after the first stop. The party stayed there four days, during which time Darwin took several walks. On 6 August, in the afternoon, they stood out to sea, with the intention of making a direct course to the Cape Verde Islands. Unfavorable winds, however, having delayed them, on the 12th they ran to Recife, Pernambuco (SC-25, 8-35d). Darwin visited the city, went to Olinda (SC-25, 8-35c), and on the 17th took final leave of South America.

On the 2nd of October, 1836, the Beagle anchored at Falmouth, where Darwin left her, having lived on board the little vessel for nearly five years.

The time spent aboard the Beagle were the most active which he ever spent. Returning to England, after going backwards and forwards several times between Shrewsbury, Maer,

Cambridge, and London, Charles settled in lodgings at Cambridge on 13 December 1836, where all his collections were under the care of Henslow. He stayed there three months, and got his minerals and rocks examined by the aid of Professor Miller.

He began preparing his 'Journal of Travels' and sent also, at Lyell's request, a short account of his observations on the elevation of the coast of Chile to the Geological Society.

On 7 March 1837 he took lodgings in Great Marlborough Street in London, and remained there for nearly two years, until he married. During these two years he finished his 'Journal', read several papers before the Geological Society, began preparing the MS for his 'Geological Observations', and arranged for the publication of the Zoology of the voyage of the Beagle. In July he opened his first note-book for facts in relation to the 'Origin of Species', about which he had long reflected, and never ceased working for the next 20 years.

After his marriage in 29 January 1839, he moved to Upper Gower Street (the house was bombed in the Spring of 1941), in London, and there worked on his 'Coral Reefs', and other papers. He met several eminent scientists, including Humboldt, attended the meetings of several scientific societies, and acted as secretary of the Geological Society. But such attendance, and ordinary society, suited his health so poorly that he and his wife resolved to live in the country, which they both preferred.

After several fruitless searches in Surrey and elsewhere, they found a house in Down and purchased it on 14 December 1842. There he wrote his many contributions to science: the second edition of his 'Journal of Researches' (1845), and the 'Geological observations on South America' (1846).

Darwin (1908: 39-42) wrot: "From September 1854 I devoted my whole time to arranging my huge pile of notes, to observing, and to experimenting in relation to the transmutation of species. During the voyage of the Beagle I had been deeply impressed by discovering in the Pampean formation great fossil animals covered with armour like that on the existing armadillos; secondly, by the manner in which closely allied animals replace one another in proceeding southwards over the Continent; and thirdly, by the South American character of most of the productions of the Galápagos Archipelago, and more especially by the manner in which they differ slightly on each island of the group; none of the islands appearing to be very ancient in a geological sense."

"It was evident that such facts as these, as well as many others, could only be explained on the supposition that species gradually become modified; and the subject haunted me. But it

was equally evident that neither the action of the surrounding conditions, nor the will of the organisms (especially in the case of plants) could account for the innumerable cases in which organisms of every kind are beautifully adapted to their habits of life — for instance, a woodpecker or a tree-frog to climb trees, or a seed for dispersal by hooks or plumes. I had always been much struck by such adaptations, and until these could be explained it seemed to me almost useless to endeavour to prove by indirect evidence that species have been modified."

"After my return to England it appeared to me that by following the example of Lyell in Geology, and by collecting all facts which bore in any way on the variation of animals and plants under domestication and nature, some light might perhaps be thrown on the whole subject. My first notebook was opened in July 1837. I worked on true Baconian principles, and without any theory collected facts on a wholesale scale, more especially with respect to domesticated productions, by printed enquiries, by conversation with skillful breeders and gardeners, and by extensive reading. When I see the list of books of all kinds which I read and abstracted, including whole series of Journals and Transactions, I am surprised at my industry. I soon perceived that selection was the keystone of man's success in making useful races of animals and plants. But how selection could be applied to organisms living in a state of nature remained for some time a mystery to me."

"In October 1838, that is, fifteen months after I had begun my systematic enquiry, I happened to read for amusement Malthus on *Population*, and being well prepared to appreciate the struggle for existence which everywhere goes on from long-continued observation of the habits of animals and plants, it at once struck me that under these circumstances favourable variations tend to be preserved, and unfavourable ones to be destroyed. The result of this would be the formation of new species. Here, then, I had at last got a theory by which to work; but I was so anxious to avoid prejudice, that I determined not for some time to write even the briefest sketch of it. In June 1842 I first allowed myself the satisfaction of writing a very brief abstract of my theory in pencil in 35 pages; and this was enlarged during the summer of 1844 into one of 230 pages, which I had fairly copied out and still possess."

"But at that time I overlooked one problem of great importance; and it is astonishing to me, except on the principle of Columbus and his egg, how I could have overlooked it and its solution. This problem is the tendency in organic beings descended

from the same stock to diverge in character as they become modified. That they have diverged greatly is obvious from the manner in which species of all kinds can be classed under genera, genera under families, families under sub-orders, and so forth; and I can remember the very spot in the road, whilst in my carriage, when to my joy the solution occurred to me; and this was long after I had come to Down. The solution, as I believe, is that the modified offspring of all dominant and increasing forms tend to become adapted to many and highly diversified places in the economy of nature."

"Early in 1856 Lyell advised me to write out my views pretty fully, and I began at once to do so on a scale three or four times as extensive as that which was afterwards followed in my *Origin of Species*; yet it was only an abstract of the materials which I had collected, and I got through about half the work on this scale. But my plans were overthrown, for early in the summer of 1858 Mr. Wallace, who was then in the Malay Archipelago, sent me an essay *On the Tendency of Varieties to depart indefinitely from the Original Type*; and this essay contained exactly the same theory as mine. Mr. Wallace expressed the wish that if I thought well of his essay, I should send it to Lyell for perusal."

"The circumstances under which I consented at the request of Lyell and Hooker to allow of an abstract from my MS., together with a letter to Asa Gray, dated September 5, 1857, to be published at the same time with Wallace's Essay, are given in the *Journal of the Proceedings of the Linnean Society*, 1858, p. 45. I was at first very unwilling to consent, as I thought Mr. Wallace might consider my doing so unjustifiable, for I did not then know how generous and noble was his disposition. The extract from my Ms. and the letter to Asa Gray had neither been intended for publication and were badly written. Mr. Wallace's essay, on the other hand, was admirably expressed and quite clear. Nevertheless, our joint productions excited very little attention, and the only published notice of them which I can remember was by Professor Haughton of Dublin, whose verdict was that all that was new in them was false, and what was true was old. This shows how necessary it is that any view should be explained at considerable length in order to arouse public attention."

"In September 1858 I set to work by the strong advice of Lyell and Hooker to prepare a volume on the transmutation of species, but was often interrupted by ill-health, and short visits to Dr. Lane's delightful hydropathic establishment at Moor

Park. I abstracted the Ms. begun on a much larger scale in 1856, and completed the volume on the same reduced scale. It was published under the title of the *Origin of Species*, in November 1859. Though considerably added to and corrected in the later editions, it has remained substantially the same book."

"It is no doubt the chief work of my life. It was from the first highly successful. The first small edition of 1250 copies was sold on the day of publication, and a second edition of 3000 copies soon afterwards. Sixteen thousand copies have now (1876) been sold in England; and considering how stiff a book it is, this is a large scale. It has been translated into almost every European tongue, even into such languages as Spanish, Bohemian, Polish, and Russian. It has also (...) been translated into Japonese, and is there much studied. Even an essay in Hebrew has appeared on it, showing that the theory is contained in the Old Testament! The reviews were very numerous; for some time I collected all that appeared on the *Origin* and on my related books and these amount (excluding newspaper reviews to 265; but after a time I gave up the attempt in despair..."

During the two last months of 1859 he was fully occupied in preparing a second edition of the *Origin*, and by an enormous correspondence. On January 1st, 1860, he began arranging his notes for a book on the *Variation of Animals and Plants under Domestication*; but it was not published until the beginning of 1868; the delay having been caused partly by frequent illnesses, one of which lasted seven months, and partly by being tempted to publish on other subjects which at the time interested him more. These "other subjects" resulted in books like *Fertilisation of Orchids* and other botanical papers published in 1862, a long paper on *Climbing Plants*, sent to the Linnean Society in the Autumn of 1864; and in 1868 came out his *Variations of Animals and Plants*. These were followed by *Descent of Man* (1871), *Expression of the Emotion in Men and Animals* (1872), *Insectivorous Plants* (1875), *Effects of Cross and Self-Fertilisation in the Vegetable Kingdom*, *The Different Forms of Flowers* (1876), and in 1880, with his son Frank's assistance, he published *Power of Movement in Plants*. On May 1st, 1881, he sent to the printers the MS of *The Formation of Vegetable Mould through the Action of Worms*.

He died on 17 April 1882.

In his autobiography (1908: 54) he concluded with the following remarks: "My success as a man of science, whatever this may have amounted to, has been determined, as far as I can judge, by complex and diversified mental qualities and conditions.

Of these, the most important have been — the love of science — unbounded patience in long reflecting over any subject — industry in observing and collecting facts — and a fair share of invention as of common-sense. With such moderate abilities as I possess, it is truly surprising that I should have influenced to a considerable extent the belief of scientific men on some important points".

### P. H. Gosse

PHILIP HENRY GOSSE, the second child of Thomas and Hannah Gosse, was born in High Street, London, on 16 April 1810. Travelling by Birmingham and Salisbury, the Gosses went, in June 1812 to Poole, where Philip spent his childhood. Between 1823 and 1825 he left the grammar school at Brandford. In 1827 he began work in a counting house at Poole.

In the spring of 1827, the firm of Messrs. Harrison, Slade, and Co., whalers, offered him employment as a clerk in their counting-house at the port of Carbonear, in Newfoundland. On Sunday morning, 22 April 1827, as the bells were ringing the people of Poole to church, having a few days before completed his seventeenth year, Philip Henry Gosse slipped down the harbour in a boat and climbed on board the brig *Carbonear*, ready to get under way for Newfoundland.

He spent eight years in Newfoundland, studying natural history in leisure times. In 1835 he bought a farm at Crompton, Canada, staying there until 1838. He sold his farm, as it was unsuccessful, and went to Philadelphia. Later he went to Dallas, Texas, and worked as a schoolmaster.

He returned to England in January 1839, where he kept a school at Hackney. Early in 1844, while he was chatting one day with his friends in the insect room of the British Museum, Edward Doubleday suggested that Philip Gosse would do well as an insect collector in the tropics. Demerara was originally proposed; then Jamaica, as being less known to naturalists, and, entomologically, absolutely virgin ground. The British Museum had almost nothing from Jamaica, nor was anything known of the natural history of the island since the days of Sloane and Browne. Gosse jumped eagerly at the suggested proposal. He had already had some experience in Newfoundland, Canada, and Texas, and immediately began to prepare. He read up all the works which touched upon the zoology of the West Indies, made drawings of

desiderata, especially of orchids, butterflies, and hummingbirds, constructed collecting-boxes, and gradually bought the necessary materials.

Doubleday introduced him to Hugh Cuming, of Gower Street, as an agent for selling the collections to be made, and this gentleman gave Gosse some useful instructions.

On 20 October 1844 Gosse sailed from the Thames on board a vessel bound for Jamaica. Just about the same time David Dyson set out for Honduras. Gosse arrived at Port Royal on 6 December, staying in Jamaica from 1844 to 1846. With his headquarters in Bluefields, he explored every locality of the island, on whose fauna of insects he published a paper afterwards (1848). The relation of his travels appeared in 1853.

He left Jamaica on 11 July 1846, stopping on the way home in San Juan, Puerto Rico (13 July), St. Thomas, and Bermuda (20 July). Aboard the ship he caught a violent fever. On 5 August 1846 he was landed in Southampton, whence he took an early train to London.

In 1848 he married Emily Bowes. The next year his son Edmund Gosse (later Sir Edmond, and a member of the Royal Microscopical Society) was born. Edmond Gosse published his father's biography (1896) and also recollections of his clash between Philip's austere evangelicalism and his (Edmond's) incipient agnosticism as a young child (1907).

Philip was elected Associate of the Linnean Society in 1850. In 1851 he suffered from nervous dyspepsia, going to stay at St. Marychurch, Devon, in the following year, as a convalescent. In 1853 he worked in Dorset for the Zoological Society, and returned to London at the end of the year. In 1856 he was made a Fellow of the Royal Society (4 June). The death of his wife occurring on 9 February 1857, he returned to St. Marychurch. Three years later he married Eliza Brightwen, and continued living in Devon, doing scientific work. He was elected member of the Entomological Society in 1879, and died at St. Marychurch on 23 August 1888 (Andrews, 1961; Gosse, E., 1896, 1907; Gosse, P. H., 1848, 1853; "J.T.C.", 1888; Stageman, 1955).

### A. R. Wallace

ALFRED RUSSELL WALLACE, born at Usk, Monmouthshire, on 8 January 1823, and educated at Hertford Grammar School, early became a voyager on a small scale, during his residence with an elder brother, a land surveyor and architect. From 1836

to 1848, while so occupied, he resided in various parts of England and Wales, and acquired some knowledge of agriculture and of the social and economic conditions of the laboring classes. While living in South Wales about 1840 he first turned his attention to collecting and preserving the native plants, eagerly reading books of travels.

While residing at Leicester in 1844-1845 (as an English master in the Collegiate School), he made the acquaintance of H. W. Bates, an ardent entomologist, and when, some years later, the desire to visit tropical countries became too strong to be resisted, he proposed to Bates a joint expedition to the Amazons. As Wallace himself pointed out in the preface of his book of travels (1853: i):

"An earnest desire to visit a tropical country, to behold the luxuriance of animal and vegetable life said to exist there, and to see with my own eyes all those wonders which I had so much delighted to read of in the narratives of travellers, were the motives that induced me to break through the trammels of business and the ties of home, and start for

*'Some land where endless summer reigns'.*

My attention was directed to Pará and the Amazon by Mr. Edward's little book, 'A Voyage up the Amazon', and I decided upon going there, both on account of its easiness of access and the little that was known of it compared with most other parts of South America.

I proposed to pay my expenses by making collections in Natural History and I have been enabled to do so; and the pleasures I have found in the contemplation of the strange and beautiful objects continually met with, and the deep interest arising from the study in their native wilds of the varied races of mankind, have been such as to determine my continuing in the pursuit I have entered upon, and cause me to look forward with pleasure to again visiting the wild and luxuriant scenery and the sparkling life of the tropics!"

Wallace and Bates met in London early in 1848 to study the collections of South American animals and plants already there; and they embarked at Liverpool in a small trading vessel on 20 April 1848. Although Bates accompanied Wallace at first, from March 1850 on, the former took a different route of exploration. So, here, we will consider the travels separately.

Wallace arrived in Belém (SA-22, 48-1c) on 26 May 1848, after a voyage of 29 days from Liverpool. The following days were occupied in walking in the neighborhood of the city, presenting passports, and obtaining license to reside, familiarising

himself with the people and the vegetation, and endeavoring to obtain a residence fitted for his pursuits. He moved to a "rocinha" or country-house belonging to a Mr. Miller, consignee of the vessel, half a mile from the city. In about three weeks Wallace and Bates had captured upwards of a 150 distinct species of butterflies.

After many inquiries, they succeeded in procuring a house to suit them. It was situated at Nazaré, about a mile and a half south of the city (now one of the main squares in Belém, a few blocks from the Goeldi Museum of Natural History).

During their stay in Belém, Wallace and Bates visited a country-house of the Swiss Consul in Pará, Mr. Borlaz, as well as Maguari, a saw and rice-mill belonging to a Mr. Upton, an American, two miles from the city, being received there by a Canadian, the manager, Mr. Leavens; they also visited Laranjeiras.

On 3 August 1848 the first entomological collections were packed to be sent to England, containing 550 species of Lepidoptera (400 of butterflies), 350 of beetles, and 400 of other orders, making in all 1300 species of insects.

On the afternoon of the 26th of August they left Belém for the *Tocantins River*, as Mr. Leavens had been informed that plenty of cedar was to be found there, and greatly wished to make a trip to examine it, and if possible, bring a raft of the timber down to Belém.

The party left on a canoe, the following day, entering the *Rio Moju* (SA-22, 49-2b). A stop was made at "Jigheri" (Jaguarari, on the *Rio Acará*; SA-22, 48-2a), where Wallace and Bates collected insects. On the 28th they left the *Moju*, entering the *Igarapé Mirim* (SA-22, 49-2b), reaching a place called Santana (?). On the 30th they crossed the *Tocantins* (SA-22, 49-2c), proceeding up to Cametá (SA-22, 49-2c), whence they proceeded some 30 miles up the river, to the "sítio" (small farm) of Vista Alegre, belonging to a Mr. Gomes, to whom they had an introduction. On 2 September they went to Jambouassu (?), a "sítio" about 15 miles below Baião (SA-22, 50-3b), where a Mr. Seixas resided. After a brief stay, they embarked for Baião, where they collected for 4 days.

Proceeding up the river they stopped at Jutahi (Ilha Grande do Jutai, SA-22, 50-3d), at a cattle estate, on 9 September, leaving on the next day; on the extensive sandbanks nearby Wallace collected many Carabidae. The other localities visited were Patos (Nazaré dos Patos; SA-22, 50-3d), Troquera (*Rio Trucará*; SA-22, 50-3d), Panajá (?), Alcobaza (?), Ilha dos Santos (?).

Ilha das Pacas, and Aroyas (?), a mile below the falls of the same name. From the falls they returned to Panajá (19 September), and then to Belém, arriving there on 30 September, 5 weeks after their departure.

Wallace resided in Oleria (Olaria) in Belém, for a while. On 3 November he left again, for the Island of Mexiana (SA-22, 50-0d), via the *Rio Pará* (SA-22, 49-2b), and round the eastern point of Marajó Island. He reached Mexiana after 4 days of voyage, and remained on the island collecting, until January 1849, when he moved to another farm, on the Island of Marajó (SA-22, 50-1b). There he spent a week, returning once more to Belém.

Wallace went again to live in Nazaré. As insects were not plentiful at that season, he wished to get a hunter to shoot birds for him, and came to an arrangement with a Negro named Luís, who had been with Natterer during the whole of his 17 years' residence in Brazil. Natterer had purchased Luís in Rio de Janeiro as a boy; when the Austrian naturalist left Belém in 1835 he gave him freedom.

In May Wallace bought a canoe and travelled to São Domingos (do Capim; SA-23, 48-2c), a little village at the junction of the *Guamá* and *Capim* rivers. After spending nearly a week there, without much success, he decided to proceed up the *Capim* (SA-23, 48-2d), and 3 days afterwards reached a farm called São José, remaining there until June. From there he went back to Belém.

In the beginning of July Wallace's younger brother, Herbert, came out to Pará to assist him; and by the return of the vessel in which his brother arrived, Wallace sent off the collections of fish and insects he had made up to that time.

In August the two brothers went to Santarém (SA-21, 55-2d), where they arrived after a prolonged voyage of 28 days. After some days spent in Santarém, they descended the river to Monte Alegre (SA-21, 54-2c). They explored the neighborhood of the country, and in October returned to Santarém, where they stayed collecting and receiving visits of friends, among them the botanist Richard Spruce, who had recently come to Santarém.

Because by November the rains had started and gloomy weather had set in, they determined to start for the *Rio Negro* as soon as they could. After procuring some Indians, they left Santarém for Óbidos (SA-21, 55-2a), where they again met Spruce, who had left before them. They occupied themselves in the forest, where they found insects very abundant, and at length

set off again, this time to Vila Nova (now Parintins; SA-21, 57-3b), about four days' voyage from Óbidos. After a period of residence they continued their trip, and towards the end of December 1849 reached the village of Serpa (Ilha de Serpa; SA-21, 58-3c), where they spent Christmas. On 31 December 1849 they arrived at the city of Barra do Rio Negro (now Manaus; SA-20, 60-3c).

In Manaus they spent many months. In May 1850 they visited a farm called Manaquiry (now the village of Manaquiri; SA-20, 60-3c), situated on the south side of the Solimões, about a hundred miles above its junction with the *Rio Negro*, returning in July to Manaus, as Wallace expected letters and remittances from England. In August the letters finally came, and Wallace started packing up, buying forgotten necessities for the voyage, making up a box for England, giving instructions to his brother, who was to stay in Manaus for six months and then return to England, and was finally ready to start on a voyage of 700 miles up the *Rio Negro* and probably for a year's absence.

In the last day of August 1850, Wallace bade adieu to Manaus. One week later he reached Ayrão (Airão; SA-20, 61-2a), and Pedreiro (?). He then passed the mouth of the *Rio Branco* (SA-20, 62-1d), and proceeding up the *Rio Negro*, passed by Carvoeiro (SA-20, 62-1c), Barcelos (SA-20, 63-1b; September), Cabuqueno (?; 3 October), Santa Izabel (?; 4 October), Castanheiro (SA-20, 66-0d; 8 October), "Wanawacá" (Uanaracá; SA-19, 66-0c; 11 October), São José (?; 12 October), São Pedro (SA-19, 60-0d; 15 October), the mouth of the *Rio Curicuriari* (?), portaged the falls of the *Rio Negro* on the 19th, reaching São Gabriel (now Uaupés; SA-19, 67-0c), entering the *Rio Uaupés* (NA-19, 68-0a) on 23 October. On the 24th he reached Nossa Senhora da Guia (NA-19, 67-0a), at the junction of the rivers *Içana* and *Negro*. Proceeding up the *Negro*, he entered its tributary, the *Içana* (NA-19, 68-1b), and through another tributary, the *Rio Cubate* (NA-19, 67-1c) visited the "Serra de Cobáti" (Cubate; ?). On the way there Wallace met a young "mameluco" girl (descendant of white and Indian), fair and handsome, the daughter of the celebrated naturalist, J. Natterer, by an Indian woman. After the exploration of the Serra de Cubate, where a dozen, much desired, "galos da Serra" (*Rupicola rupicola*) were obtained, Wallace returned in December to Nossa Senhora da Guia.

On 27 January 1851 he left Guia and paddled up against the stream, passing by Mabé (NA-19, 67-1c; 28 January), the

mouth of the *Rio Xié* (NA-19, 67-1a; 29 January), "Serra de Cababuri" (Cauaburi; 30 January), and Marabitanas (NA-19, 67-1d; 31 January), the frontier fort of Brazil. On the first day of February Wallace reached the "Serra de Cocolí" (Piedra de Cucuy; NA-19, 67-1b), which marks the boundary between Brazil and Venezuela. On the 4th he reached San Carlos (NA-19, 62-2c), the principal Venezuelan village on the *Rio Negro* and the furthest point reached by Humboldt from the opposite direction (see Vol. I, pp. 36-37). On 5 February 1851 Wallace walked into the forest along the road to Solano (NA-19, 67-2d), a village on the *Casiquiare*; then he proceeded via San Miguel, Tomo (NA-19, 68-3d; a village at the mouth of the river of the same name), the mouth of the little river *Pimichín* (NA-19, 68-3d), to Javita (NA-19, 67-3c), a village on the *Temi* (NA-19, 67-3a, 67-3c), a branch of the *Atabapo*, which flows into the *Orinoco*. In Javita Wallace had to stay until 31 March, whence he retraced his steps to Marabitanas and Nossa Senhora da Guia (end of April).

On 3 June he started up the *Uaupés*, passing by São Joaquim (NA-19, 67-0a), Assai-Paraná (?), Ananarapicoma (?), Mandu-Paraná (?), and São Jerônimo (?) (12 June), being very ill with dysentery and continual pains in the stomach.

A few days afterwards he went up the river to a village called "Jukeira Picóma" (Salt Point), then to Juarité (Iauarité; NA-19, 69-1c), a village near the waterfalls of the same name, the second great rapids on the *Uaupés*. There he had the opportunity to enjoy an Indian festivity, with dances and other ceremonies. He went back to Jukeira (June 1851), where a week was spent, *Urubuquara* (Falls; NA-19, 69-0b), and then São Jerônimo, arriving in Nossa Senhora da Guia on 24 July.

He decided at length to go down to Manaus, and return once more afterwards to the upper *Rio Negro*. However, only on 1 September was he able to get pilots and Indians to take him to Manaus. Through São Gabriel (*Uaupés*; SA-19, 67-0c), the mouth of the *Camanaú River* (SA-20, 61-2a), and São José (?), Wallace reentered Manaus on 15 September. There he again met Spruce, who occupied the house that belonged to Natterer, and where he kindly accommodated Wallace during his stay.

By the end of October Wallace left Manaus, to return to the *Rio Negro*. His intention was to obtain as large as possible a collection of living birds and mammals. Through Pedreiro (?), Carvoeiro (SA-20, 62-1c), 'sítio de João Cordeiro' (?) (29 October), 'sítio do Sr. Chagas' (?; 12 November), "Wanawacá" (*Uanaracá*; SA-19, 66-0c), and São Gabriel (*Uaupés*; SA-19,

67-0c), he reached São Joaquim (NA-19, 67-0a), at the confluence of the rivers *Uaupés* and *Negro*. From the last village he returned to São Gabriel to meet Spruce, and then went back to São Joaquim to set forth for the upper *Uaupés*, as soon as he could procure men and get his canoe ready.

At length, on 16 February 1852, two months and twenty-three days after his arrival at São Joaquim, Wallace left on his voyage up the *Uaupés*, passing by São Jerônimo (?; 21 February 1825) and Jauraté (Iauraté; NA-19, 69-1c; 28 February). After portaging many waterfalls, he reached the *Cachoeira do Mucura* (?), the goal of the expedition. On 25 March 1852 he left Mucura, going back to São Jerônimo (23 April) and then to São Joaquim (NA-19, 67-0a; 26 April). In São Joaquim several of his 52 live animals (monkeys, parrots, etc.) died or were lost. In May he returned through Barcelos (SA-20, 63-1b; 8 May), the mouth of the *Rio Branco* (SA-20, 62-1d; 11 May), "Aipurus-sá" (Aiparuçá; 61-3b; 15 May), to Manaus (17 May), then the capital of the newly created Province of Amazonas.

Wallace stayed in the new capital until 10 June, when the canoe that would transport him to Belém arrived. He had a great number of cases and boxes to transport. Out of a 100 live animals which he had purchased or had been given to him, there remained only 34, consisting of 5 monkeys, 2 macaws, 20 parrots and paroquets of 12 different species, 5 small birds, a white-crested Brazilian pheasant, and a toucan.

Going down the *Amazons*, Wallace passed Vila Nova (Paritins; SA-21, 57-3b; 13 June), Óbidos (SA-21, 55-2a; 14 June), Santarém (SA-21, 55-2d), and Gurupá (SA-22; 52-1d; 18 June); he reached Breves (SA-22, 50-2a) on the 22nd, and, entering the *Rio Pará*, arrived in Belém on 2 July.

In Belém he learned that a vessel would probably sail for England in about a week. On 12 July 1852 he got aboard the brig 'Helen', 235 tons, and saw for the last time the white houses and waving palm-trees of Pará.

On the morning of 6 August they had reached about latitude 30°30'N, longitude 52°W, when the Captain of the 'Helen' communicated to Wallace:

— I'm afraid the ship's on fire; come and see what you think of it.

Wallace confirmed that this was true — the ship had caught fire and nothing could be done. The Captain thought it prudent to secure their own safety, and called all hands to get out the boats.

Wallace went down to the cabin, now suffocatingly hot and full of smoke, to see what was worth saving. He got his watch and a small tin box containing some shirts and a couple of old note-books, with some drawings of plants and animals, and scrambled up with them on deck. Many clothes and a large portfolio of drawings and sketches remained in his berth; but he did not care to venture down again, and felt a kind of apathy about saving anything.

On deck the crew were busy at the boats; two barrels of bread were got in, some wine, and a large cask of water. The boats, having been so long drying in a tropical sun, were very leaky, and full of water, and books, coats, blankets, shoes, pork, and cheese, in a confused mass, were soaking in them. It was necessary to put two men in each, to bale.

The Captain at length ordered all into the boats, and was himself the last to leave the vessel.

They now lay astern of the ship, to which they were moored, watching the progress of the fire. Many of the parrots, monkeys, and other animals they had on board, were already burnt or suffocated; they tried to get some of them into the boats but the animals did not seem at all aware of the danger they were in. Only one parrot escaped: he was sitting on a rope hanging from the bowsprit, and this burning above him let him fall into the water, where, after floating a little way, they picked him up.

The vessel burnt the whole night. At length morning came; the crew set up the little masts of the boats, and rigged their sails; and went along before a light east wind. Pencils and books were hunted for, and the course and distance to Bermuda calculated; they found this, the nearest point of land, was at least 700 miles away. After several days of navigation, water began to be scarce, and on 13 August, under the very hot and oppressive sun, they suffered much from thirst.

The nightmare continued until 5 PM of the 15th, when a sail was seen, and by seven o'clock they were received aboard the 'Jordeson', from Cuba, bound for London. They were picked in latitude 32°48'N, longitude 60°27'W, being still two hundred miles from Bermuda.

It was then, when the danger appeared past, that Wallace began to feel fully the greatness of his loss. "With what pleasure", said Wallace, "had I looked upon every rare and curious insect I had added to my collection! How many times, when almost overcome by the ague, had I crawled into the forest and been rewarded by some unknown and beautiful species! How many



Party of naturalists near the Serra dos Órgãos, Rio de Janeiro (Rugendas)



places, which no European foot but my own had trodden, would have been recalled to my memory by the rare birds and insects they had furnished to my collections! How many weary days and weeks had I passed, upheld only by the fond hope of bringing home many new and beautiful forms from those wild regions; every one of which would be endeared to me by the recollections they would call up, — which should prove that I had not wasted the advantages I had enjoyed, and would give me occupation and amusement for many years to come! And now everything was gone, and I had not one specimen to illustrate the unknown lands I had trod, or to call back the recollection of the wild scenes I had beheld! But such regrets I knew were vain, and I tried to think as little as possible about what might have been, and to occupy myself with the state of things which actually existed."

Finally, after so many adventures, on the 1st of October Wallace landed at Deal, after an eighty days' voyage from Pará. He reached London on 18 October 1852.

Wallace's '*Travels on the Amazon and Rio Negro*', published in the Autumn of 1853, had an excellent reception, and after disposing of the collections which had been sent home previous to his return, Wallace started for another tropical region, the Malay Archipelago.

From July 1854, when he arrived to Singapore, to the early part of 1862, Wallace travelled many thousand miles, mostly in regions little explored before, especially for natural history purposes. Borneo, Java, Sumatra, Timor, Celebes, the Moluccas, the Aru and Kei Islands, and even New Guinea were visited, some more than once, and long sojourns were made in the most interesting regions. Even those who have read his delightful '*Malay Archipelago*', first published in 1869, cannot know all the treasures given to science by Wallace's eight years' expatriation; for before writing his travels he had contributed no fewer than eighteen papers to the transactions or journals of the Linnean, Zoological, and Entomological Societies, and twelve articles to various scientific periodicals, while in his subsequent volumes on '*Natural Selection*' (1871), his monumental work on the '*Geographical Distribution of Animals*' (1876), on '*Tropical Nature*' (1878), and on '*Island Life*' (1880) he laid open still more fully his accumulation of travel and thought in both hemipheres.

Wallace was awarded in 1868 the Royal Medal of the Royal Society for his many contributions to theoretical and practical zoology; in 1870 he received the Gold Medal of the 'Société de

Géographie de Paris'; in 1876 he was president of the biological section of the Glasgow meetings of the British Association. In 1881 he was awarded a Civil List pension of £ 200 a year, in recognition of the amount and value of his scientific work, and in 1882 the University of Dublin conferred upon him the honorary degree of LL. D. His autobiography was published in 1905. He died in 1913 (George, 1964; Wallace, 1853, 1905, 1939).

### H. W. Bates

HENRY WALTER BATES was born at Leicester on 8 February 1825. He must have developed early a taste for entomology, for when only seventeen or eighteen years of age he published notes on Coleoptera in the 'Zoologist'. Bates came of a mercantile family, and was himself destined for a career of this nature; but about the year 1845 he made the acquaintance of Alfred Russel Wallace. Two years later Wallace proposed a joint expedition to Pará, in order to collect insects and other natural history objects, attracted to this locality by the account of the country in W. H. Edwards 'Voyage up the Amazon', a choice confirmed by Edward Doubleday, who had just received some new and very beautiful butterflies collected near the city of Belém.

Bates sailed from Liverpool, England, in a small trading vessel, on 26 April 1848; after a swift passage from the Irish Channel to the Equator, he arrived on 26 May off Salinas (Salinópolis; SA-23, 47-1a), on the coast of the Province of Grão Pará, Brazil.

On the following day and night he sailed with a light wind, aided by the tide; up the *Pará River* (Baía de Marajó; SA-22, 48-1a), passing by Vigia (SA-22, 48-1a), and on the morning of the 28th arrived at Belém (SA-22, 48-1c). The Capital of the then Province of Grão Pará (which included the Province of São José do Rio Negro, now the State of Amazonas), was called Santa Maria do Grão Belém do Pará, and was commonly abbreviated to 'Pará'. It is thus cited in many of Bate's labels and entomological writings of the time.

Bates was received in Belém by a certain Mr. Miller, consignee of the vessel, in whose house Bates went to live. Afterwards he moved to Mr. Miller's 'rocinha' (small plantation) in the outskirts of the city, and at length rented a house in Nazaré, now a district of the city of Belém. In Nazaré Bates stayed collecting from 15 June to 26 August 1848, making excursions to

Maguari, near the *Ititiri Greek*, which communicates with the *Rio Pará* by the *Maguari Greek*.

From Belém Bates dispatched the first collections obtained in those localities, and decided to proceed with Mr. Leavens, the owner of a rice-mill at Maguari, to the *Rio Tocantins*, profiting an occasion offered by one of Mr. Leaven's commercial voyages.

Leaving Belém on 27 August 1848, through the *Bay of Guajará* (SA-22, 48-1c), the party entered the *Rio Moju* (SA-22, 49-2b) as far as *Igarapé-Miri* (SA-22, 49-2b), and entering the channel of *Murutipucu* (?), arrived at the *Rio Tocantins* (SA-22, 49-2c). Crossing that river, they arrived in the morning of the 30th at *Cametá* (SA-22, 49-2c), on the left margin of the *Tocantins*. Proceeding up the river, they passed by *Vista Alegre*, 15 miles above *Cametá*, where they remained for two days, and, navigating by the river bank, 25 miles above *Vista Alegre*, reached *Baião* (SA-22, 50-3b), where they remained from 3 to 7 September, and then the waterfalls of *Tapaiunaquara* and *Arroios* (?) (16 September). On the following day they commenced the downward voyage.

Bates said (p. 85): "in descending the river we landed frequently, and Mr. Wallace and I lost no chance of adding to our collection; so that before the end of our journey we had got together a very considerable number of birds, insects and shells, chiefly taken, however, in the low country."

Passing again by *Baião* and *Cametá* (24 September), they entered the *Anapu* (?) on the 27th, and on the 30th "after threading again the labyrinth of channels communicating between the *Tocantins* and the *Moju*, arrived at *Pará* [Belém]".

On 7 December 1848 Bates left Belém again, aboard a small trading vessel, and the next morning passed by the *Furo do Arrozal* (?), and landed in *Caripi* (?), in the Island of *Carnapijó* (SA-22, 49-1d). There he remained nine weeks, until 12 February 1849. At *Caripi* he met a certain Petzell, who had come to Brazil thirteen years before, to serve in the Brazilian army, with a number of Germans. After a few months' rambling, Petzell left the place to establish himself in the United States, where he married, went to Illinois, and settled as farmer near St. Louis. He remained on his farm seven or eight years, and had a family of five children. He could never forget, however, the free river-life and perpetual summer of the Amazons, so he persuaded his wife to consent to break up their home in North America and migrate to *Pará*. Petzell and his family were expert insect collectors, and were employed by Bates during his residence in

Caripi. Bates "amassed at Caripi a very large collection of beautiful and curious insects, amounting altogether to about twelve hundred species".

Returning to Belém (12 February 1849) Bates remained there until June, when he started on the 8th on a second voyage to Cametá. There he remained until 16 July 1849.

Leaving Belém once more on 5 September 1849 he went to Cametá (SA-22, 49-2c), remaining there 12 days, and then, going down the *Tocantins* and entering the *Rio Pará* (SA-22, 50-2b), he proceeded through the *Furo de Breves* (25 September), Breves (SA-22, 50-2a; 26 September), and several other "furos" (channels between two rivers), reaching the mouth of the *Xingu River* (SA-22, 52-2a) on 3 October. On the 6th he passed by Almeirim (SA-22, 53-2b), and, following the right margin of the *Amazons*, after a monotonous trip, he reached the mouth of the *Paraná de Maicá* (SA-21, 54-2c), arriving in Santarém (SA-21, 55-2d) on 9 October. The following day he headed for Óbidos (SA-21, 55-2a), remaining there making collecting trips from 11 October to 19 November 1849.

Proceeding up the *Amazons* he passed Vila Nova (Parintins; SA-21, 57-3b) in the end of November, and, leaving that village on 4 December, arrived on the 6th at a place called 'Barreiro de Carauaçu', on the island of Tupinambarana (SA-21, 58-3b), where he spent 10 days of collecting. In the meantime, he visited Lake of Carauaçu, in the interior of the island, much tormented by mosquitoes and horseflies.

Sailing again on 16 December, he arrived at Serpa (SA-21, 58-3c) on the 24th, and for 5 days collected in the surroundings. The mouth of the *Madeira* (SA-21, 59-3d) was crossed on the 31st, and the vessel anchored once more at a small farm near the mouth, until 8 January 1850.

On 9 January 1850 Bates reached Matari (?), a settlement of the Mura Indians. Proceeding by the *Furo da Eva* (near Ilha da Eva; SA-21, 59-3c; 14 January), stopping in several places to collect, as Farm Jatuarana (18 January), where he was attacked by the terrible 'piuns' (Simuliidae), the party finally reached the city of Barra do Rio Negro (Manaus; SA-20, 60-3c) on 22 January, or 64 days after the departure from Óbidos.

Bates decided then to explore the *Rio Solimões* (SA-20, 61-4a; name taken by the *Amazons River* above Manaus). Leaving Manaus on 26 March 1850, he passed by Manacapuru (SA-20, 61-3d; 30 March), *Paraná de Araunai* (?; 22 April), the mouth of the *Catuá* (*Igarapé Catuá*; SA-20, 64-4a; 25 April),

reaching Ega (now Tefé; SA-20, 65-3d) on 1 May 1850. On 23 May he visited a family of Passé Indians, 20 miles up a creek tributary to the *Rio Tefé* (SA-20, 65-4b), and after a few days returned to Ega. On 26 September he left again, to visit a beach where turtles were laying, in "Shimuni" (?). Returning to Ega, he went on two more trips, one on 6 October, to a place situated at a short distance from the mouth of the *Ananá* (?), and the second on 16 October, going again to "Shimuni" (?), and then descending the river to the *Igarapé Catuá* (SA-20, 64-4a; 20 October — 3 November). He returned to Ega on 10 November 1850.

Circumstances then compelled him to return to Pará (Belém). Leaving Ega on March 1851, he descended the river to the Capital in 29 days. In Belém he caught yellow fever, during one of the epidemics which occurred in the city. After recovering, he sent all his collections to England, and prepared for a new voyage.

From Belém he went to Santarém (SA-21, 55-2d), arriving there on November 1851, and made the city his headquarters during a period of no less than three years and a half. During that time he explored intensively the *Rio Tapajós* and other places of interest in the surroundings. His favorite collecting ground was Mapiri (*Igarapé Mapiri*; SA-21, 55-3a), about 5 miles within the mouth of the *Tapajós*, to the west; to the east his rambles were extended to the banks of the *Maicá* inlet (SA-21, 54-2c), and to the south they extended further than the banks of the *Irurá* (?) *Uruará*; (SA-21, 55-3c). He visited the banks of the *Irurá* and the rich woods accompanying it, and two other streams in the same neighborhood, one called the *Panema*, and the other the *Unumari* (?), once or twice a week during the whole time of his residence in Santarém, and made large collections of their natural products.

Six months after he had come to Santarém, Bates resolved to explore the *Tapaiós*. Leaving the city on 8 June 1852 he went to Alter do Chão (SA-21, 55-3b), remaining there until 17 June; he passed the *Paquiatuba Creek* (?) on the 19th, entering the *Channel of Tapaiuna* on the 21st, reaching Aveiro (SA-21, 55-4a) on the 23rd. In Aveiro he spent 40 days collecting. Sailing on 2 August, he decided to ascend a branch river, the *Cupari* (SA-21, 55-4a), which enters the *Tapajós* about eight miles above the village, proceeding to the first waterfalls, and from there returning to the *Tapajós*, which he entered on 21 September, returning then to Santarém.

\* \* \*

After a very profitable stay in Santarém, Bates left that town in May 1855, proceeding up the *Amazons* to Ega (now Tefé; SA-20, 65-3d), making his headquarters there, for the long period of four and a half years. In the meantime, several excursions were made beyond Ega. The first one was to Tonantins (SA-19, 68-3b). Leaving Ega on 7 November 1856, he reached Tonantins on 11 November, remaining there until the 30th, leaving in a trading schooner, which passed the mouth of the *Jutai* (SA-19, 67-3a) on 3 December 1856, remained 4 days within the mouth of the *Sapó* (?; a small tributary of the *Jutai*), Fonte Boa (SA-19, 66-3a; 7 December to 25 January 1857), and finally going back to Ega.

The second expedition was made to São Paulo de Olivença. From Ega (SA-20, 65-3d; 5 September 1856) Bates took the steamer 'Tabatinga', and proceeded up the *Solimões*, and after a rapid voyage, went further than Tonantins, reaching São Paulo de Olivença (SA-19, 69-3d) on 10 September. During his residence of 5 months, in his fourth month of sojourn he had an attack of ague, and was forced to abandon the former idea of proceeding to the Peruvian towns of Pebas and Moyobamba. He employed a collector in the town of Tabatinga (SB-19, 70-4d), above São Paulo de Olivença, who obtained for him insects of the Peruvian border.

On 2 February 1858 Bates departed for Ega. During his long residence in that city, he collected more than 3,000 new species, among the 7,000 species obtained from that place. With his rich harvest Bates left Ega on 3 February 1859, and descended the *Amazons*, reaching Belém on 17 March. In the capital he collected once more in the old paths which he had crossed during his first stay in 1848. He remained there until 2 June 1859, when he left for England, embarking on a North American vessel, the 'Frederick Demming', for New York. His collections were divided into three portions and sent by separate ships, to lessen the risk of loss of the whole.

"On the evening of the third of June, I took a last view of the glorious forest for which I had so much love, and to explore which I had spent so many years. The saddest hours I ever recollect to have spent were those of the succeeding night when, the *mameluco* pilot having let us free of the shoals and out of sight of land though within the mouth of the river at anchor waiting for the wind, I felt that the last link which connected me with the land of so many pleasing recollections was broken."

On his return to England he commenced the working up of his collections in an energetic and thorough manner. He published

papers on various orders, but his attention was first chiefly given to the Lepidoptera. It was, too, at this period, that he published his famous paper in the 23rd volume of the 'Transactions of the Linnean Society', calling attention to the resemblances between different species of Lepidoptera and in fact founding the theory of mimicry. When he had completed his work on the butterflies, he parted with the material he had accumulated, selling it to Messrs. Godman and Salvin.

In England he came under the influence of Darwin and Sir Joseph Hooker. Darwin prompted him to write the narrative of his travels and put him in touch with the foremost publisher of natural history books of the day, John Murray.

Bates married in 1861, while still in the midst of the laborious task of condensing his notes of eleven years into book form. Despite ill-health Darwin generously read the final manuscript; the two-volume first edition appeared in January 1863. The book was a great success, the first edition being exhausted in a few months. Later an abridged edition was prepared.

In 1864 he became Assistant-Secretary in the Royal Geographical Society, and continued in this post to the great advantage of the Society until the time of his decease. After his appointment to the secretaryship, his entomological work was necessary curtailed. But he occupied himself in his leisure with diligent and detailed work at the Coleoptera, and described a very large number of new species of Cicindelidae, Carabidae, Lamellicornia, and Longicornia.

During the 33 years that elapsed between his return from the Amazons and his decease he became widely known as an entomologist, and his personal acquaintances amongst entomologists of repute were probably more numerous than those of any other individual. He was twice President of the Entomological Society of London.

In his last days he was attacked by an aggravated form of the gastric catarrh from which he sad suffered for many years, and when he became the victim of an attack of influenza and bronchitis he speedily succumbed on 16 February 1892 at the age of 67 years. Before his death he was decorated by the Emperor of Brazil, D. Pedro II (Bates, 1851-56, 1962; Garcia, 1922; Sharp, 1892; Woodcock, 1969).

### Other collectors

Concerning the other collectors or owners of collections cited by Walker in his publications, nothing could be found, not even in the accession books of the British Museum (Natural History), which I have examined in 1970 through the courtesy of Dr. Harold Oldroyd.

The names cited are: BADGERLEY (Pará, Brazil), COFFIN (Mexico), GLENNIE (Mexico), HARRINGTON (Brazil), MILLER (Honduras), MORNAY (Brazil), NOEL (Brazil), O'REILLY (Brazil), A. SINCLAIR (Brazil), STEPHENS (Brazil), Sir CHARLES STEWART (Brazil, Honduras), and TUCKER (Brazil).

Of. G. GRAHAM and R. GRAHAM it is known, through Bates, (1962: 105), that they collected in the Lower Amazons, and that were "capsized" [at Caripi, Carnapijó Island, Bay of Marajó], whilst passing in a heavily-laden montaria to [their] large canoe".

J. P. GEORGE SMITH, also cited by Walker, was the son-in-law of J. E. Gray, keeper of zoology in the British Museum, and seems to have collected in Pará and Pernambuco, Brazil, around 1844.

On the other hand, several insects were acquired by the British Museum from dealers in London, such as Argent, established at Bishopsgate Street; Messrs. Leadbeater, established in Brewer Street, Golden Square; and especially from Mr. Samuel Stevens (1817-1899), a natural history agent at 24, Bloomsbury Street; Mr. Stevens acted as agent in the distribution of natural history specimens of Messrs. Wallace and Bates, gathered during their trips to the Amazon (Anon., 1899; British Museum (Natural History), 1906).

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*Chapter XII*

## Westwood and Walker

### J. O. Westwood

John Obadiah Westwood was born at Sheffield, England, on 22 December 1805 and died shortly after completing his 87th year, on 2 January 1892, at Oxford. His father was a die sinker at Sheffield, but afterwards removed to Lichfield. When nearly 16 years of age Westwood went to London to be articled to a solicitor, and though he devoted his attention more to the study of natural history than of law, he was admitted to the bar as a solicitor and became partner in a firm. Having some private means, which he augmented by writing and drawing he was enabled to neglect his profession and devote himself entirely to entomology and archaeology.

Westwood was actively associated with the Entomological Society of London, from its foundation in 1833, and was for many years its secretary. Subsequently he was elected president at three periods of two years each, and was made honorary lifetime president when the Society celebrated its jubilee in 1833. He was also a fellow of the Linnean Society, from 1827.

His dipterological publications include descriptions of miscellaneous new species (1835a, 1835b), a revision of the Mydidae (1841), a monograph of the Bombyliidae genus *Systropus* (1842), and two papers on Acroceridae (1848, 1876). Among other

publications, special mention must be made of his "Introduction to the Modern Classification of Insects", a systematic arrangement of the genera of British insects (1840).

In 1858 the Reverend F. W. Hope, a wealthy amateur, who had been for years a warm friend and patron of Westwood, and had purchased his collections, gave them and his own to the University of Oxford, and founded a Professorship of Invertebrate Zoology, which bears his name. Westwood was appointed the first Hope Professor, and in consequence removed to Oxford, where he was a conspicuous figure in the University for 35 years (Anon., 1893; Wandolleck, 1893).

### F. Walker

Francis Walker was the seventh son, and the tenth and youngest child, of Mr. John Walker, a gentleman of independent fortune, residing at Arno's Grove, Southgate, where Francis was born on 31 July 1809. His father had a decided taste for scientific activities, especially natural history; he was a fellow of the Royal and Horticultural Societies, and vice-president of the Linnean, so that his son's almost boyish propensity for those studies could be explained by those influences.

In 1816 Walker's parents were staying with their family at Geneva, then the center of a literary coterie, in which they met, among other celebrities, Lord Byron, Madame de Staël, and the naturalists Saussure and Vernet. They spent more than a year in Geneva and Vevey, and in 1818 proceeded to Lucerne, from which place Francis, then a boy nine years of age, made the ascent of Mount Pilatus, in company with his elder brother Henry; their object, in addition to mountain climbing, being the collecting of butterflies. The family afterwards visited Neuwied and returned to Arno's Grove in 1820.

In 1830 the two brothers, Henry and Francis, again visited the Continent, and now it was purely an entomological tour, Mr. Curtis, the well-known author of "British Entomology", being their companion. This party collected the French Satyridae most assiduously on the Island of Jersey and afterwards at Fontainebleau, Montpellier, Nantes, Vaucluse, etc.

Walker's career as an author commenced in 1832. He contributed to the first number of the "Entomological Magazine" the introductory chapter of his "Monographia Chalciditum".

In 1834, somewhat reluctantly, he consented to undertake the editorial management of the Entomological Magazine, and resig-

ned this office the following year, yet continued to be a constant contributor to its pages. The same year he visited Lapland.

From 1837 to 1863 he was hired by the British Museum to describe the insect collections, receiving £ 1 per genus and one shilling per species. During his lifetime, it is calculated by Horn (1937: 432), Walker prepared some 20,000 ("zahllosen und trostlosen"; innumerable and untrustworthy) descriptions of insects in several orders.

Walker's first paper on neotropical flies was published in 1837, containing the descriptions of the Diptera collected during Captain P. P. King's survey of the Straits of Magellan.

In May 1849 Walker married May Elizabeth the eldest daughter of Mr. Ford, of Ellel Hall, near Lancaster, and spent the summer in the Continent, again collecting in Switzerland.

In 1848 he had explored the Isle of Thanet, and in 1849 the Island of Wight. During these two years the first four volumes of the "List of the Specimens of Dipterous Insects in the Collection of the British Museum" were published. In the succeeding years, 1850 and 1851, he visited Geneva and Interlaken. During 1859 he published the first part of a work on the Diptera in the collections of W. W. Saunders, and a smaller number of new species in the "Zoologist". He also commenced work on Diptera for a projected series of works on British insects, to be called "Insecta Britannica".

From 1851 to 1852, the second and third parts of his "Insecta Saundersiana" were published, and from 1854 to 1855 the three supplements (vols. 5-7) of his "List".

In 1856 appared the fourth and last part of the *Insecta Saundersiana*, and in 1857 Walker published the first part of the "Characters of Undescribed Diptera in the Collection of W. W. Saunders", in the Transactions of the Royal Entomological Society.

Another tour on the Continent occupied a considerable portion of 1857, Walker visiting Calais, Rouen, Paris, Strasbourg, Baden-Baden, Heidelberg, Wiesbaden, Frankfurt, Mainz, Köln, Brussels, Aix-La-Chapelle, and Antwerp. During this journey he collected in the Black Forest.

In 1860 the second part of the "Characters" was published, and the summer of this same year was devoted to a thorough exploration of the Channel Islands. In 1861 Walker's excursions were confined to North Devon, and the third part of the "Characters" was published. In 1863 he toured the English lakes.

In the spring of 1865 he visited North Wales and Ireland. In the autumn he again visited Paris, Geneva, Lucerne, Interlaken, and Altdorf, ascending the Righi, Mount Pilatus, and the Mürren; proceeding to Kanderstag, the Oeschinen See and the Gemmi Pass.

In 1867 we find him again in France and Switzerland, ascending the Col de Voza, and examining the Jardin of the Mer de Glace; thence over the Tête Noire to Martigny, Sion, and the Great St. Bernard, detouring through St. Maurice and Villeneuve to Geneva.

In 1869 he made the tour of the Isle of Man, and returned to Holyhead; in 1870 he paid another visit to Llanberis, as well as to all the more beautiful scenery in North Wales, crossing over to Ireland, and touring that island from south to north; and in 1871 he examined entomologically the Scilly Islands and the districts of the Lizard and the Land's End.

In 1872 he turned his attention to Italy, visiting Rome, Piza, Lucca, Florence, Naples, Sorrento, Capri, Milan and Venice, as well as the Lakes of Como and Maggiore.

Finally, in 1874, he had again proceeded as far as Aberystwyth, on his way to Ireland, when his intention was frustrated by illness which terminated fatally on the 5th of October, 1874 (Newmann, 1874).

Walker used to take the insects of the British Museum home to describe them. It is said by Horn (1937: 432) that "dem brave Fr. Walker passierte dabei nicht selten, dass ihm 'die ganze Geschichte' auf die Strasse fiel!" (not seldom it happened to the brave Fr. Walker that the whole "kit and kaboodle" fell into the street". His careless descriptions aroused much argument, and it is stated by an anonymous writer at the Entomological Monthly Magazine for 1874 (p. 141): "the authorities of the British Museum who permitted the scandal, came under the lash of such criticism as has happily seldom been directed against scientific men. This criticism had no other effect than (apparently) to increase the evil. Walker, by nature, appeared to be utterly indifferent to anything that could be hurled at him, and the only apparent answer on the part of the ruling power at the Museum was the commencement of Catalogues of hitherto unassailed groups or orders."

Baron Osten Sacken was especially acid when he wrote about Walker (1878: xvi-xix): "Mr. Walker's writings on the order of Diptera are no better than his publications on Lepidoptera, Hemiptera and Orthoptera, as characterized by other authors. The same species are often found described under several dif-

ferent specific names and placed in different genera; well characterized species of a certain genus are placed in the wrong, sometimes in very distant genera, or even in the wrong family. In the great majority of cases, the descriptions of new species were drawn from a single, often hardly recognizable specimen; and when new species happen to be represented by more than one type-specimen, these are almost sure to belong to different species. [Here Osten Sacken cites several instances of Walker's misidentifications and proceeds:] Mr. Walker's identifications of the species of former authors are often, I may say in most cases, incorrect."

"These facts are given as a warning for entomologists not to trouble themselves too much about the interpretation of Mr. Walker's descriptions, because in most cases, they will find themselves misled by the very data furnished by him..."

"The authorities of the British Museum, in a most praiseworthy, and truly scientific spirit, have bestowed a great deal of labor upon preserving and labelling Mr. Walker's types. But the task of singling out the original type of the description, from among the specimens added afterwards, is by no means an easy one, often hardly possible. Furthermore, it is a well-known fact that authors are apt not to be very careful with their own types; to remove and displace them, when made aware of an error; and Mr. Walker, in this respect, was not an exception. Neither this, nor any other types can, therefore, be implicitly relied upon, and we have, ultimately, to fall back on the descriptions. — In rescuing those of Mr. Walker's descriptions, which are available and in rejecting the remainder, as useless, we pursue, I think, a course consistent both with justice and scientific expediency."

According to a survey made by George Steyskal, Walker described some 732 Neotropical species of Diptera. Of these a great majority remain to be recognized.

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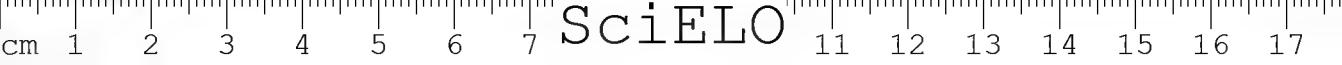
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*Chapter XIII*

## Rudolph A. Philippi

Rudolph Amandus Philippi, son of Wilhelm Eberhard Philippi and Marianne Krumwiede, was born on 14 September 1808, in Charlottenburg, near Berlin. Those times were full of agitation — Europe was trembling under the Napoleonic troops; Prussia was reduced to one-third of its territory, with a population of less than 3.000,000 inhabitants.

Philippi's education started in Charlottenburg. When 10 years old he was sent with his elder brother Bernhard Eunom to Yverdon (Ifferten), Switzerland, where the famous Pestalozzi had installed a center of education much renowned then by the new methods of teaching. In spite of the fact that the institute was in decadence, due to the wars, Philippi was able to take a good course. He was taught very little of natural history (only three months), but in the library he could read books to his interest. With Abadofski he learned how to prepare herbaria; with his colleagues he reared butterflies from caterpillars and frequently undertook excursions through the Jura and Neuchatel.

In the end of 1822 the two brothers left the institute and went to Brandenburg, where their father was then living. From 1822 to 1826 Philippi frequented the "Gymnasium zum grauen Kloster" (so called because before of the Protestant Reform it was a convent of Franciscans) and prepared himself to enter the Uni-

versity. There he learned classical languages, French, Italian, and English.

On 6 March 1826 he passed examinations to enter the University of Berlin to study medicine and natural history. He entered the University on 22 March. There he studied with some of the most famous teachers, among whom were Rudolphi, Link, Lichtenstein, Klug, Humboldt, Wiegmann, etc.

He took his laureate on 17 April 1830, his doctoral dissertation being on the Orthoptera of Berlin. His doctor's degree was obtained when he was 21 years old (26 April 1830). Philippi set out to visit some of the great European hospitals. During the first days of 1831 he travelled to Italy, not so much to practice in the hospitals, but more to rest, as the studies had debilitated him. In Naples he met Friedrich Hoffmann and Arnold Escher von den Lind, the first a mineralogist, and the second a collector of natural history specimens. With them Philippi undertook a trip through southern Italy, Calabria and Sicily, where they remained for one and a half years. With a great amount of natural history specimens, Philippi returned to Berlin in 1833, and published several papers.

To be able to become a practicing medical doctor, Philippi had to pass special examinations; he took them, and was approved on 22 April 1833. However, he dedicated himself to natural history, instead of medicine, and on 20 February 1835 was named professor of natural history at the Polytechnical School of Cassel. On 1 January 1836 he married his cousin Carolina Krumwiede.

In the beginning of 1837, with his health undermined by several diseases, he obtained permission to leave Cassel, and returned to Italy, becoming established in Naples, whence he made excursions to Sicily and Calabria. As his permission had expired, he obtained a prorogation for one more year. On 16 December 1838 the first of his children, Friedrich Philippi, was born in Naples. In that same year his brother Bernhard Eunom travelled to Chile, with the medical doctor Carlos Segeth, and there became established as a collector of natural history specimens for European museums. Afterwards he entered at the service of the Chilean Government, becoming sargent-major of the army.

In the beginning of 1840 Philippi returned to Cassel, where he took again his teaching position and published several works related to his second trip to Italy. He remained in Cassel until 1848, dedicated to his family and his work.

In 1848 the duchies of Schleswig and Holstein rebelled against the King of Denmark. Philippi, who had until then



The descent of a river in canoe (Prince Wied-Neuwied)



refrained from entering politics, joined the moderate liberal party, and participated in several commissions for the reform of teaching.

In 1849 Bernhard Eunom returned to Cassel, commissioned by the Chilean Government to propagandize for immigration to Chile, and persuaded his brother Rudolph to follow him to that country. Knowing that Philippi wanted to leave Prussia, the Minister Eberhardt called him to learn the reason. Philippi answered that his reasons were two: the situation of Prussia in general and his disagreement with the direction of the Polytechnical School of Cassel. Eberhardt named him then the director of that school (March 1849), with the authorization to undertake any reforms he liked to propose. However, in September of that same year the ex Prime Minister, Hassenpflug, reassumed his post and the instructions of his predecessor were left without effect. At the same time, the Prince Elector of Hesse left his domains, and Cassel was invaded by an army of 25,000 men (Austrians and Bavarians). Philippi asked for his dismissal on 27 December 1850, and decided to leave Europe with his family and with his disciple C. Ochsenius.

The party left Hamburg on 20 July 1851, aboard the brig "Bonito", 300 tons, bound for Valparaiso, Chile. The crossing of Cape Horn was difficult, due to violent storms, and took 6 weeks. During the crossing they suffered from shortage of drinking water. After 135 days from their departure from Hamburg, they landed in Valparaiso on 4 December 1851.

From Valparaiso Philippi intended to proceed to Valdivia, where his brother owned a farm. However, by that time, Chile was suffering from civil wars — the Province of Concepción had rebelled against the president-elect, Manuel Montt, proclaiming as president General Cruz, who was marching towards the north with a great army. The steamer 'Araucano', which made the regular line Valparaiso-Valdivia, where Philippi intended to embark, was captured by the revolutionaries. He had to wait for another ship bound to Valdivia, and meanwhile had to remain in Santiago. In the Chilean Capital Philippi met the professor of mineralogy, Ignacio Domeyko, who introduced him to several authorities, including President Montt.

Finally, on 1 January 1852 Philippi and Ochsenius were able to embark aboard the 'Republicano', which would proceed to Valdivia. After 21 days of navigation they were approaching the port of Corral, when the shot of a gun was directed against the ship, intimating the Captain to drop anchor. The owner of the ship did not understand the message, and a second blow was directed against the vessel, this one almost killing Philippi. The ship was

immediately placed under arrest; as soon as the authorities had an agreement, the ship was able to proceed to Valdivia.

Philippi was counting on being received in Valdivia by his brother; but his misfortunes had not ended — his brother Bernhard had been named governor of Magallanes and was absent. Philippi asked where his brother's farm "San Juan" was, and followed thither with Ochsenius. As the farm was not yet legalized, Philippi could not work on it. With his disciple he decided then to explore the Volcano of Osorno.

On 21 July 1852 Bernhard returned to Valdivia and finally settled the purchase of the farm. The two brothers then moved there and dedicated themselves to agriculture.

However, by a decree of President Montt, Philippi was named professor of botany and zoology at the University of Chile, on 7 October 1853, and was charged with the foundation of a botanical garden. Moreover, on 10 December 1853, he was named director of the National Museum in Santiago, with a salary of 1,500 'pesos' per year. Philibert Germain, who until then had been administrator of the Museum, became a subordinate of Philippi, with an annual income of 800 'pesos'.

In November 1853, commissioned by the Government, Philippi undertook an excursion to the Atacama Desert. From Atacama (SG-19, 20-70d), where he established his headquarters, he visited several other localities, such as Cobija (SF-19, 23-70a), Potosí (?), Río Loa (SF-19, 22-70b), Molinos (SF-19, 18-70d?), Antofagasta (SF-19, 24-70a), and Copiapó (SG-19, 27-70c). He returned on 30 January 1854, bringing excellent collections of natural history for the Museum.

From then on, a series of excursions to several regions of Chile was started by Philippi and his collaborators, among them Philibert Germain (see Vol. 1, pp. 160-161), Ferdinand Paulsen, and others (Krause, Röhner, Cox and Scythe), about whose lives and travels very little is known. During holidays, or during the travels which Philippi had to undertake commissioned by the Government, he collected a great amount of specimens.

In 1854 Philibert Germain explored the Juan Fernández Islands, and in 1855 the localities of Talcahuano (SJ-18, 37-73a) and Tomé (SJ-18, 37-73b), as well as a part of the Cordillera de Talca.

In 1857, while Germain explored the Island of Chiloé (SK-18, 42-74d; SK-19, 42-72a), Fonck collected in the Chonos Archipelago (SL-18, 45-75d).

In 1858, by order of the Minister of Foreign Relations of Chile, Philippi visited the German colonies in the south of the

country, reaching Lake Llanquihue (SK-18, 41-73d; December 1858 to March 1859).

In 1860 Philippi collected in the Province of Aconcagua exploring more especially the Farm Catemu (?), and also visiting the Laguna de Ranco (SK-18, 40-72c). Meanwhile, Landbeck explored the Cordillera de Colchagua.

In 1862 Landbeck collected in Illapel (SH-19, 32-71a), and Philippi on the Volcán de Chillán (SJ-19, 37-71a). In March of the following year he stayed at the Termas de Chillán (SJ-19, 37-72b), and spent 3 days in November at the Juan Fernández Islands.

In 1865 appeared his great contribution to the Chilean dipterology — the 'Aufzählung der chilenischen Dipteren'. The types were deposited at the National Museum in Santiago, where many of them still remain.

Several other regions of Chile were visited by Philippi and the other members of the Museum's staff. In the Province of Valparaíso the shoreline was well explored, especially the village of Algarrobo (SI-19, 33-72d), the center of the excursions. There Germain and Landbeck spent most of their collecting time. The Province of Chillán contributed many specimens, notably from the Termas (or Baños; "thermal baths"; SJ-19, 37-72b) de Chillán. Francisco Fonck and Hermann Krause brought specimens from the Cordillera Pelada (?), and Philippi and his family gathered a great mass of material at their Farm "San Juan" in Valdivia.

Collecting trips were made until 1896, the territory of Chile being almost entirely explored.

Philippi's wife died in 1867. In 1875 Philippi obtained Chilean citizenship. He remained as director of the Museum for 43 uninterrupted years, when he asked for his dismissal, which was granted on 15 April 1897, with an annual pension of 4,000 pesos. His son took his post.

Philippi published 414 papers during his lifetime, and left some unpublished, a total of 450 papers. Collecting trips' reports were published in the *Anales de la Universidad de Chile* (Expedición al Volcán de Osorno, 1853; Geografía de la provincia de Valdivia. Excursión a la Laguna de Ranco, hecha en Enero de 1860, 1861; Viaje a los baños y al nuevo Volcán de Chillán, 1862; Viaje a las regiones septentrionales de la Patagonia. Catálogo de los insectos recogidos, 1863; Excursión botánica en Valdivia (Cordillera de la Costa) y descripción de las plantas nuevas, 1865), in *Petermann's Mitteilungen* (Die sogenannte Wüste Atacama und die grossen Plateaux-Bildungen der Anden südlich vom 19°, 1856; Die Provinz Valdivia und die deutschen Ansiede-

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Among his manuscripts the following reports of travels were left: *Reise nach Juan Fernandez*; *Excursion nach dem Algarrobo*; *Reise nach Matanzas und Cahui*; *Reise nach Tomé, Quiriquina, Salto de la Laja*; *Reise nach Alfalfal*; *Reise nach Lehu, Arauco, Moquegua und Colina*; and *Reise nach Coquinho*.

Among his entomological papers must be cited: insects of Chile (1859), description of a fly found in nasal cavities (1861), insects of Magallanes (1862), fauna of Peru (1863, 1866), fauna of Atacama (1860), description of a fly (1861), the Diptera from Chile (1865), and description of new Chilean dipteron (1875).

Philippi died on 23 July 1904, at an age of approximately 96 years; his funeral was financed by the Chilean Government (Barros, 1904; Gotschlich, 1904; Ochsenius, 1906).

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## *Chapter XIV*

### The voyages of the 'Eugenies' and the 'Novara'

#### *The voyage of the 'Eugenies'*

With the development of Swedish relations and commerce with the western coast of America, the West Indies, and China, it became necessary to name several consuls to the most important commercial centers in those regions. In the autumn of 1851 the King of Sweden decided to send a ship to protect the navigation along the commercial routes, to investigate the activities of the consular authorities, and to develop new commercial centers.

For this voyage the 40-gun frigate 'Eugenies' was selected, being especially adapted for the long sea-cruise in the dockyards of Karlskrona.

The King called the attention of the Royal Academy of Sciences to the opportunity of the proposed expedition, which offered an excellent occasion for several scientific observations, as well as a chance to enrich the collections of the Academy. On 18 June 1851 the Academy accepted the royal proposal, which was promulgated on 25 July. Two new cabins were constructed aboard the 'Eugenies' to receive the scientific personnel.

Captain C. A. Virgin was to command the expedition. First-Lieutenant C. Skogman was in charge of the nautical and astronomical observations, and also held responsible by the Royal

Academy of Sciences for the physical observations; to him we owe the report of the activities of the scientific commission (1854, 1942). J. G. M. Kinberg, medical doctor, was the official zoologist. As botanist of the expedition Prof. K. J. Andersson was named, a professor of the Universities of Uppsala and Stockholm. Mr. K. J. Johannsen was charged with the physical observations together with Lieutenant Skogman.

In order to apportion to the crew some moments of pleasure, the Captain obtained from the authorities permission to substitute 6 sailors for an number of musicians. A small library was also added to the ship.

The 'Eugenies' left the dockyards on 18 September 1851, with the corvette 'Lagerbjelcke', this one commanded by Captain C. E. Engelhardt. The corvette was to accompany the frigate as far as Rio de Janeiro and *La Plata*, and afterwards return to Sweden, visiting several ports of Brazil and Argentina.

On 30 September 1851, at 10 A. M., the chief of the admiralty, Admiral Baron Nordenskjöld, visited the frigate 'Eugenies', and made a brief speech, wishing every success in the undertaking. Then the frigate weighed anchor.

On its arrival in Rio de Janeiro, the scientific commission visited the Botanical Gardens and other districts of the city. On 22 December 1851 the 'Eugenies' left Rio early in the morning. On the 29th the frigate anchored in Montevideo, where the naturalists landed to visit the country.

On 3 January 1852 they ascended the *Rio de La Plata*, reaching Buenos Aires. Several collecting trips were made around that city, which was agitated at that time by political upheavals antecedent Rosas' decline. On 12 January 1852 the frigate left the Argentinian Capital, again anchoring in Montevideo on the 15th. Leaving on the 17th, it passed by Cabo Blanco (SL-19, 47-67d; Province of Santa Cruz) on the 24th, and that same day anchored at the Bahía de Desvelos (SM-19, 48-66c), following afterwards to the Cape of the Virgins (Cabo de las Virgenes; SN-19, 52-68c), the southernmost limit of the Province of Santa Cruz, where the 'Eugenies' laid anchor on 27 January 1852. The slow speed of the frigate permitted Dr. Kinberg to dredge the ocean floor, collecting by this means several species of molluscs.

Entering the Strait of Magellan, the 'Eugenies' sailed from Cape Dungeness (SN-19, 52-68c), the first Chilean port in the Province of Magallanes, to Port Famine, on 28 January. Johannsen made several magnetic observations. Kinberg and An-

dersson made an excursion to Cerro Tarn (3,000 ft; SN-19, 54-71a), returning to the frigate with remarkable specimens of the fauna and flora. On the beaches several molluscs were gathered. They stayed for 3 days at Port Famine, leaving on 3 February 1852.

As it was dangerous to sail during the night, after leaving Port Famine the frigate anchored in the Bahia San Nicolás (SN-19, 54-71a), about 7 miles east of Cape Forward, at 10 P.M. At 7 in the morning it weighed anchor and stopped again at the Bay of York, west of the mouth of the rivulet Bachelor (probably at the Isla Santa Inés; SN-19, 54-73b). Thence, the 'Eugenies' proceeded to the Bay of Borja (?), passed Cabo Pillar (?) on 10 February, the western limit of the Straits of Magellan, then the Isla de los Evangelistas (SN-19, 52-75c; 11 February), Cabo Rumena (SJ-18, 37-74d; 20 February), arriving at Valparaíso (SI-19, 33-12d) on the 23rd.

The scientific commission remained in Valparaíso until 5 March, when the frigate sailed again, passing the Isla San Gallán and the Islas Chinchas (SD-18, 14-76a) on 12 March, and reaching Callao (SD-18, 12-77c), Peru, on the 15th. The naturalists collected in Lima for some time. Skogman's relation ends at this point of the trip. The frigate proceeded then to the west, visiting several other regions, which are out of the scope of the present work, and after a navigation of one year and nine months anchored at last in Stockholm, on 3 July 1853, at 7 P.M. (Skogman, 1854, 1842; Persson, 1971).

The Diptera collected during the stops of the 'Eugenies' were studied by Carl Gustav Thomson. Thomson was born on 13 October 1824 in Mellan-Grefvie Parish in Skaane, Sweden, of an honorable old Malmö family. His family were the agriculturists Johan Thomson and his wife Christina Hansson. After having completed his primary education in Malmö, Thomson became a student at Lund in 1843, Ph. D. in 1850, assistant at the Lund Zoological Museum in 1853, lecturer in zoology in 1857, assistant in entomology and intendant for entomological meetings in 1862, and also in 1864 ordinary assistant in entomology as well as holder of one of the assistantships which were not attached to a definite branch of study. His specialties were principally Homoptera and Coleoptera. He published 8,800 pages during his life time. His descriptions of the Diptera collected by the 'Eugenies' voyage, and which resulted in one of the worst publications of dipterology, appeared in 1869. He died on 20 September 1899 (Bengtsson, 1900).

### The voyage of the 'Novara'

On 30 April 1857 the Austrian frigate 'Novara' left Trieste for a circumnavigation of the globe. This voyage, designed primarily as a training venture for navy personnel, had the secondary purpose of accumulating geological and natural history collections.

The scientific commission of the 'Novara' consisted of seven naturalists, of whom five are mentioned in various places as having made natural history collections. These are Ferdinand von Hochstetter, the geologist; Eduard Schwarz, the botanist; Karl Ritter von Scherzer, the ethnologist-geographer; and finally, GEORG FRAUENFELD and JOHAN ZELEBOR, the two zoologists.

Schwarz, Frauenfeld, and Zelebor stayed with the 'Novara' for the entire trip, while Hochstetter remained behind in New Zealand. When the expedition arrived in Chile, it was informed of the outbreak of the Franco-German war, so it was decided to discontinue the trip and return directly to Trieste. Scherzer, however, left the 'Novara' at Valparaiso, to travel separately up the west coast of South America (by steamer) and did not rejoin the expedition until its arrival in Gibraltar.

During the two-year voyage the 'Novara' visited and collected extensively in 18 areas.

Leaving Trieste on 30 April 1857, via Gibraltar and Madeira, the 'Novara' arrived in Rio de Janeiro on 5 August 1857. We have a vivid account of the stay of the naturalists in that city by Georg Frauenfeld (1858).

On the naturalists' arrival in Rio, 5 August 1857, the weather was very bad, with continuous rains. Frauenfeld stayed at the house of the German consul, Avé-Lallament, at Laranjeiras, a beautiful district of Rio, enjoying the great library, specialized in books of travel. Next Monday (10 August) the weather improved, and the naturalists decided to go to the German colony of Petrópolis (SF-23, 43-23a) the next day to collect in the forest. Going to Porto Estrela, they went to the Serra da Estrela by railroad (Estrada de Ferro Leopoldina, the first created in Brazil, and now extinct). Proceeding in a "bus" drawn by mules, through the Serra, they stopped twice along the route, near some "vendas" (stores). On these occasions Frauenfeld walked for a while, collecting insects. Thus he was able to collect a gall in *Melastoma trinervis*, whence a Cecidomyiidae was reared. Several Tabanidae, which were attacking the mules, were captured. After crossing the Serra da Estrela they reached Petrópolis. On their

arrival the city was enwrapped in fog, and it had started to rain, so they could not go out to collect. The next day the naturalists decided to visit a waterfall near the city, and headed to the north, through a trail in the forest. The forest was so thick, said Frauenfeld, that he was afraid of leaving the trail to get into it. Arriving at the waterfall of Itamarati, in the river of the same name, several galls were collected — one on the leaves of *Bombax*, round and divided internally in several chambers, and the other in inflorescences of *Dorstenia cyperus*.

The next day the party returned to Rio de Janeiro, and the naturalists went to collect on the Corcovado Mountain. On 19 August they programmed a "sightseeing" excursion around the Bay of Guanabara (SF-23, 43-23a), with two other naturalists of Rio de Janeiro — Manuel Ferreira Lago and Guilherme Schüch, Baron of Capanema. They visited several regions around Niterói, the islands of Paquetá and Governador, and returned to Rio de Janeiro.

Nest Friday Frauenfeld and the other naturalists of the 'Novara' were invited to a meeting of the Instituto Histórico e Geográfico Brasileiro, presided by the Emperor, Dom Pedro II. The Emperor talked about several scientific subjects with the 'Novara' naturalists, and presented Frauenfeld with a copy of the poem "Confederação dos Tamoios", by Gonçalves Dias.

The next excursion of the naturalists lasted 2 days, and was made in Gávea and Tijuca, districts of Rio de Janeiro. They were accompanied by the son of Hermann Burmeister. Passing by Andaraí, São Cristóvão, and Boa Vista, they went to the waterfalls of Tijuca; while walking amidst the forest, they entered a trail and became lost until night fell; they had then to stay at a hotel in Tijuca. Next day they descended to Gávea and returned to Rio.

As the rains had again returned, the naturalists spent several days aboard the 'Novara'. Frauenfeld went fishing with Lagos and Capanema on the beaches of Jurujuba (now a district of Niterói, State of Rio de Janeiro). Several marine specimens were collected at the occasion. Next Monday, 31 August, the 'Novara' weighed anchor and left Rio de Janeiro.

Rounding the Cape of Good Hope, the frigate headed to St. Paul's Island, Amsterdam Island, Ceylon, India, the archipelago of Nicobar, Singapore, Java, Luzon, China, Australia, and Tahiti, arriving in Valparaiso, Chile, on 17 April 1859.

The naturalists collected in Valparaiso (SI-19, 33-72d), and received the donation of natural history specimens from Dr. C. Segeth and F. Leybold. They them proceeded overland to San-

tiago and visited Casablanca (SI-19, 33-71c), Maipú (SI-19, 34-71b), Melipilla (SI-19, 34-71a), and Qillota (SI-19, 33-71a), all in the Province of Valparaíso. The 'Novara' left Valparaíso on 11 May, having left ashore Dr. Scherzer, and went to Trieste, where she arrived on 26 August.

Scherzer proceeded to Coquimbo (SH-19, 30-71a), Caldera (SH-19, 29-71b; 17 May), and Punta Cobija (SF-19, 23-70a; 20 May), in the Province of Coquimbo; Iquique (SF-19, 20-70c; 20 May), and Arica (SE-19, 18-70c; 21 May), in Tarapacá Province. Leaving Chile, he touched several ports of Peru — Chimba (SD-18, 14-75c; 21 May), Punta Islay (SD-18, 17-72c; 22 May), and Puerto Chala (SD-18, 14-76a; 23 May), all in the Departamento de Arequipa; then Pisco (SD-18, 14-76a) and the islands of Chincha (SD-18, 14-76a), in the Departamento de Ica. Arriving in Callao (SD-18, 12-77c), he went overland to Lima (SD-18, 12-77c), Cajamarquilla (SC-18, 10-77c; in Rímac Valley), Chorillos (SC-18, 11-78b), and Pachacámac (SD-18, 12-77d; 24 May to 14 June), in the Departamento de Lima; then to Huanchuco (?; 14 June), near Trujillo (SC-17, 8-79c), Province of La Libertad, and then to San José (SB-17, 7-80b; 15 June), Departamento de Lambayeque. From Paita (SB-17, 5-81c), Departamento de La Piura, he sailed on 15 June for Taboga Island (NC-17, 9-80d), Panama, and landed in Panama City, visiting the localities of Panamá (NC-17, 9-80d), Paraíso, Culebra, Matachín, Barbacoa, "Aspinwall" (Colón) (21 June), and Colón (all in Canal Zone; NC-17, 9-80b). Leaving Colón on 23 June, he sailed for Cartagena (NC-18, 10-76b) in Colombia (25 June), then left for St. Thomas Island, W. I. (NE-18, 18-76c), where he received zoological material from A. Riise (30 June).

On 1 July 1859 he left St. Thomas for England, and then for Gibraltar, where he rejoined the 'Novara' on 27 July (Gans, 1955; Scherzer, 1861-63).

The dipterological collections of the 'Novara' were studied by Shiner (see Chapter XVI).

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## *Chapter XV*

### German and Austrian collectors

#### **Appun**

KARL FERDINAND APPUN was born at Bunzlau, some 150 km west of Dresden, Germany, in 1820, and died in 1872 in Guyana. From 1847-1859 he travelled through Venezuela and Guyana; then he went up the *Amazon River* to Peru. He returned to Germany in 1868, living there for three years. In 1871 his book of travels was published. In the next year a paper on the insects of Venezuela and Guyana appeared in the *Ausland* (1872). He then returned to Guyana, where he died undertaking a trip to the interior (*Mazaruni*) (Enc.).

#### **Bilimek**

DOMINIK BILIMEK entitled himself "Custos am National Museum in Mexiko". During the unfortunate reign of Emperor Ferdinand Maximilian of Mexico, Bilimek explored the Cahuamilpa Caves, 45 leagues from Mexico City, on 14 January 1866, leaving an account of his explorations, and a description of *Pholeomyia leucozona* (1867) (Milichiidae). According to labels in the Museum of Vienna he also collected extensively in Orizaba

and Tacubaya. No other details are known about his life and travels.

### Burmeister

HERMANN BURMEISTER was born in Stralsund, northern Germany, on 15 January 1807, and died in Buenos Aires, Argentina, on 2 May 1892. In 1833 he published his first work, "Grundriss der Naturgeschichte", and four years later he was invited to occupy the chair of zoology of the University of Halle, where he was also assistant professor of geology. In 1843 he published "Geschichte der Schöpfung", and soon afterwards, with a firm prestige as a teacher and naturalist, he represented the University of Halle at the National Assembly.

Due to political misfortunes he decided to travel to Brazil, with the intention of studying the nature and to see "in loco" the paleontological discoveries then being made by P. W. Lund (see Vol. I, pp. 89-91).

On 12 September 1850, accompanied by his 18 years old son, Burmeister left Halle for Hannover, whence he embarked on the 18th. On 24 November he arrived in Rio, remaining there some time, visiting the several districts of the City. On 12 December he was received by the Emperor, Dom Pedro II, to whom he offered a copy of his 'History of Creation'.

On 21 December 1850 he left Rio, travelling to Nova Friburgo (SF-23, 43-22d), in the State of Rio de Janeiro, arriving there on the 24th. At Nova Friburgo he met Carl Heinrich Bescke, from Hamburg (see Vol. I, pp. 87-88), in those days a well-known entomological collector, who gave to Burmeister much help during his collecting trips in the neighborhood. During one of those excursions Burmeister reached the Rio Grande (SF-23, 43-22c), meeting a Frenchman living in a solitary house, with a numerous family, by name of Pinel. His father had been a private doctor to Napoleon. Pinel dedicated himself to the estudy of orchids, and collected insects, which were sent to Paris, especially to Guérin-Méneville.

Burmeister remained then in Nova Friburgo until 9 April 1851. Proceeding to Minas Gerais, by way of Mariana (SF-23, 43-20a), and Ouro Preto (SF-23, 44-20d), he reached Lagoa Santa (SE-23, 44-20b) on 13 May. There he enjoyed the company of Lund, Reinhardt and Brandt.

After his stay in Lagoa Santa, Burmeister returned to Rio, by way of Congonhas (SF-23, 44-20d), Cachoeira, Queluz (now Queluzita, SF-23, 44-21b), Barbacena (SF-23, 44-21d), *Rio Paraibuna*, *Rio Paraiba*, entered the State of Rio de Janeiro, and passing by Petrópolis (SF-23, 43-23a), reached the Capital (Rio) on 12 December.

Burmeister left Rio on 15 January 1852, on board the steamer 'Helena', bound for England. On 6 April he arrived in Halle.

In 1853 he published the report on his travels: from 1854-1856, his "Systematische Uebersicht der Thiere Brasiliens", in 3 volumes, and the 'in-folio' with 32 colored plates, "Erläuterungen zur Fauna Brasiliens" (1856).

He left then definitely for Argentina, where he travelled through the country for four years. In 1861 he published his "Reise durch die La Plata-Staaten", which owned him the position of director of the natural history museum in Buenos Aires (now Museo Argentino de Ciencias Naturales Bernardino Rivadavia), in 1862. He organized the museum and dedicated himself, during the 30 years that he lived in Argentina, to paleontological and entomological studies.

### Ehrenberg

CARL AUGUST EHRENBURG was born in Delitzsch, Province of Sachsen, Prussia, on 24 August 1801, son of the "Stadtrat und Stadtritter" Johann Gottfried Ehrenberg. Carl dedicated himself to commerce (Kauffmannstande) and travelled through St. Thomas (1827-1828), Port-au-Prince in Haiti (March 1828-June 1831), and Mexico (July 1831-April 1840), both near the Capital and 30 leagues to the interior (Mineral Real de Monte). From all those places he sent to the Museums of Berlin and Halle rich zoological and botanical collections. In Mexico he became especially interested in the Cactaceae. Upon his return to Berlin he entered in business with his brother Ferdinand. He died there on 13 August 1849, of cholera (Urban, 1903: 43).

### Garlepp

GUSTAV GARLEPP was born in Cormigte, "Kreis" Koethen, on 24 July 1862, and died in Hohenau, high Paraná River, Paraguay, on 25 February 1907. Very little is known about his travels. From

1883 to 1887 he explored the *Amazon River*, going to Peru, through the *Marañón* he entered the *Ucayali*, which he ascended to the *Yarina Cocha*; then, overland, he went to the west, entering the *Huallaga*, which he descended to the *Marañón*.

The following localities and dates are known:

1. Fonte Boa (SA-19, 66-3a) and Tonantins (SA-19, 68-3b), State of Amazonas, Brazil — 3 January-27 May 1884;
2. High *Ucayali River*, Peru — 1-31 August 1884;
3. *Lake Yarina Cocha*, Peru (SC-18, 8-75d) — 6 September-8 October 1884;
4. Sarayacu (SB-18, 7-75a), Peru — 3 November 1884-31 January 1885;
5. *Río Huallaga*, Peru;
6. Tarapoto (San Martín; SB-18, 7-76a), Peru — 5-23 February 1885; Huayabamba (San Martin; SB-18, 7-77d); *Lake Lanzy Cocha* (?) — 26-29 February 1885;
7. Juanjui (sometimes cited as "Juanjuy" or "Juanfué"), a place 3 leagues from Huayabamba (Stiglich, 1922: 590);
8. Yurimaguas (SB-18, 6-76a), Rioja (SB-18, 6-77c), and Shanusi (sometimes cited as "Shannsi"), near the river of the same name (SB-18, 6-76c) — 31 May-26 November 1885;
9. San Pedro de Cumbasa (sometimes cited as "Cumbase"; the complete name of the village is San Pedro de Cumbasa-uma de los Fanchos; "está en la orilla derecha del Cumbasa y pertenece al Dist. de Tarapoto. Este está en la orilla izquierda del Chiclayo el cual lo separa de Tarapoto, del que dista 1 leg. Cuenta con 249 habs. El Cumbasa es caudaloso y cae al Mayo cerca del Huallaga"; Stiglich, 1922: 1118).
10. Valle (San Buenaventura del) — 17 leagues from Huayabamba, 20 from Juanjui; right margin of the *Río del Valle*, half league from its mouth in the *Huallaga* (Stiglich, 1922: 1118).

From the trip undertaken from 1889 to 1891 nothing is known; he was probably in Bolivia, as in 1892 appeared his "Letters from Bolivia" in the *Deutsche entomologische Zeitschrift Iris*.

From 1892-1897, with his brother Otto, he travelled through Bolivia; Garlepp collected in the following localities:



Meeting of naturalists with Indians (Rugendas)



1. 1894 — *Rio Tanampaya* (*Tamampaya*; SE-19, 16-67c);
2. March-June 1896 — *Rio Songo* to *Rio Suapi* (SD-19, 15-68d), 1100 m;
3. October 1896-March 1897 — Yungas de Coroico, 1800 m (SE-19, 16-68d);
4. September 1899 — Yungas de La Paz, 1000 m (SE-19, 16-68c), leaving for Cuzco, Peru, in 1901.

His brother, OTTO GARLEPP, born in 1864, collected with him in Bolivia (1893-1897), and in Colombia (1898-1899) (Berlepsch, 1889). From 1902-1903 Otto Garlepp travelled with Schnuse (see Chapter XXVI).

### Gollmer

JULIUS GOLLMER (? — 1861) was an apothecary; he collected in St. Thomas, and from there went to Caracas, Venezuela, where, from 1852 to 1857, he sent to Berlin zoological and botanical collections (Urban, 1903: 52).

### Helmreichen

VIRGIL VON HELMREICHEN VON BRUNNFIELD (? — 1854) was an Austrian geologist, who came to Brazil to undertake researches in Minas Gerais, especially along the Serra do Grão Mogol (SE-23, 43-17b) and the Serra do Espinhaço (SE-23, 43-17a). Most of his documents were lost following his death in Bahia in 1854. The reports of his travels in Minas Gerais were published in 1846 and 1847 (Leinz, no date, p. 248).

### Hensel

REINHOLD FRIEDRICH HENSEL was born on 1 September 1826 in Adelnau bei Brieg, Schleswig, son of the minister C. B. Hensel, from Bojanov. From 1831 on, his father established residence in Schaidelwitz bei Brieg. His mother, Amalie Nekutsch, born in Munich, died before Reinhold completed his studies. When 10 years old, Hensel frequented the gymnasium of Brieg, and left it

for the St. Elizabeth Gymnasium in Breslau, where, during the Lent of 1846, he passed the final examinations. He then moved to the University of Breslau, to study natural history, under Gravenhorst, Purkinje, von Siebold, and Nees von Esenbeck. As a student he already had chosen zoology as his specialty. His thesis was on the importance of evolution in systematic zoology.

From 1850 to 1860 he lived in Berlin as a teacher of natural history and other related sciences. He frequented assiduously the zoologists and paleontologists. On 15 August 1853 he was named member of the Kaiserlich Leopold.-Karol. Deutsche Akademie der Naturforschung. The Academy gave him the task, and the necessary means, to undertake zoological studies in Southern Brazil. From 1863-1866 he collected in Rio Grande do Sul, especially Porto Alegre and the German colonies to the north of that city. His intention of visiting Paraguay was frustrated by a revolution.

Returning to Germany he was named in 1867 "Ordentlich Professor" of zoology, at the Academy of Proskau, Schleswig, where he remained for some years. He published several articles (1867-1870) and a monograph on the South American mammals (1872).

He retired in 1881, suffering from heart ailments. He died from a heart attack, in Oppeln, on 6 November 1881 (Martens, 1882).

### Karsten

KARL WILHELM GUSTAV HERMANN KARSTEN was born in Stralsund, northern Germany, in 1817, and died in Berlin in 1908. He studied pharmacy at Rostock, and botany in Berlin, where he graduated in 1843. He undertook two travels to northern South America — one to Venezuela (1843-1847) and the other to Colombia and Ecuador (1848-1856). Returning home, he published from 1858 to 1869 the 'Flora Columbiae terrarumque adjacentium'. He entered the University of Berlin, where soon afterwards he obtained the chair of botany (Enc.).

### Krug

CARL WILHELM LEOPOLD KRUG was born in Berlin on 1 September 1833, as son of the "Rittergutsbesitzer" Karl Krug, from Mühlenbeck bei Berlin. He studied at the "Joachimthal'sche

"Gymnasium", made his final examination (Abiturienexamen) at the "Gymnasium zum grauen Kloster", and dedicated himself to commerce. After finishing his apprenticeship in Bremen, he entered in 1857 the Company Lameyer & Co. (later Schulze & Co.), and went to Mayaguez, Puerto Rico, where later he became in possession of the exclusive right to be German and English vice-consul. To him, more than anybody else, we owe our knowledge of the fauna and flora of Puerto Rico, as he not only made several collecting trips to the western part of the island, but also payed other collectors to explore it, as Johann Gundlach (see Vol. I, pp. 181-183), who travelled there from 1873 to 1876, and P. Sintenis (see below), from 1884-1887.

He embarked back to Berlin in 1876, where he became occupied with his plants and botanical works. The State of Prussia conferred him the title of Professor. He died on 5 April 1898 in Gross-Lichterfelde bei Berlin (Urban, 1903: 69-70).

### Moritz

JOHANN WILHELM KARL MORITZ was born at Klein-Santersleben bei Gross-Rottmerleben, "Kreis" Neuhalbenleben, Province of Sachsen, Prussia, on 16 December 1797. His father was the schoolteacher Heinrich Moritz, who in 1810 moved to Barleben as singer and organist. After completing theological studies, Johann Moritz held in 1825 a position of private teacher at the house of a certain von Bredow, where he remained until 1834, when he left for the West Indies.

During the winter of 1834-35 he collected in St. Thomas, St. Jan, and from February to June 1835 in Puerto Rico, visiting Arecibo, San Juan, Caguas, Coamo, Ponce, Guayama and Yabucoa. A notice on the insects of Puerto Rico was published by him in 1836 and another in 1837. From that island he went by ship, on June 1835, to Venezuela, and explored the lands along the northern coast, the Apure and the Orinoco, and the States of Trujillo and Mérida. He returned to Germany in 1837. In 1838 he published a paper on South American caterpillars.

He returned once more to Venezuela in 1840, establishing himself at the German colony Tovar, where he sold vegetables and flowers for the market of La Guayra. He died there on 25 June 1866 (Urban, 1903: 89).

According to Weidner (1967) Moritz also collected in Colombia, and sold a part of the collection to Sommer. This is not

in accordance with the data provided by Urban (l. c.) and Pennell (1945: 44). Probably this is another confusion between Venezuela and Colombia, parts of the former having once belonged to the ancient vicekingdom of "Nueva Granada".

### Nolcken

Nothing is known about the life of Baron W. von NOLCKEN. However, from his letters (1871-72), and from the paper on Lepidoptera by Snellen (1874-75), we have a very detailed itinerary of the Baron's travels in Colombia.

He landed first at St. Thomas, West Indies, on 16 December 1870, then in Jamaica (20 December). He stayed in Colón, Panama, from 23 to 25 December, and finally landed in Santa Marta, Colombia (NC-18, 11-74a), on the 28th. From the 1st to the 17th of January, 1871, he explored Barranquilla, across the *Ciénaga de Santa Marta* (NC-18, 11-74a), and went by railroad to Sabanilla, the port of Barranquilla.

He proceeded then up the *Magdalena River* (NA-18, 4-75b; NB-18, 5-75b; NC-18, 10-75d), the river trip lasting for 9 days, aboard the 'Bismarck'. He passed by Calamar, Zambrano ("Sambrano"), Boca del Rosario, Yondo, La Dorada, Mochila, Conejo, arriving in Honda (NB-18, 5-75b) on 26 January. There he stayed collecting until the 31st, when he proceeded to Bogotá (NB-18, 5-74c, 5-74d), arriving on 4 February.

Nolcken established his headquarters in Bogotá until the month of July 1871. In the meantime he explored several places in the neighborhood.

From 26 March to 4 April 1871 he explored Ubaque (6,400'), Fomeque, Cuequeta (a farm, 7,200'), and Choachi. After 11 days again spent in Bogotá, he proceeded to Barro Blanco, Fusagasugá (16 April), Hato (5,000'; 17 April), Pandi (3,650'; 19 April), Jopal (a hut on the way between Pandi and Cundai, 3,500'; 21 April), Cundai (or Candai), Tanque (an establishment for the production of indigo, one hour after Cundai, 2,100'), Carmen, Tocaima, Anapoima, and Mesa.

Again he stayed in Bogotá, leaving on 8 June 1871 to visit the Tequendama Falls and Chipo.

He left Bogotá definitely in July, descending the *Magdalena* until Barranquilla, where he arrived on 17 July, taking a ship to Colón (19 July), and St. Thomas, finally going to Bremen, where he arrived on 12 August 1871.

### Pehlke

ERNST PEHLKE (1870-1933) was the owner of the very famous type-locality in Colombia "Hacienda Pehlke". According to the researches kindly undertaken for me by Dr. Federico Medem, Director of the Instituto Roberto Franco, Villavicencio Colombia, the "Hacienda Pehlke" or "Hacienda Hamburgo" is situated near Victoria, Departamento Caldas, 900 m above the sea level. Pehlke owned the farm until about 1920, when it was sold to Count Podewils, ex-ambassador of Germany. Nowadays the farm has been divided among colonists, and very few forested areas remain.

### Petersen

WILHELM PETERSEN was born on 31 May 1854 in Leal, Estonia. His basic studies, made at the gymnasium of Pervov, were finished in 1872, and he employed himself as a private teacher in Sellenkül, in the next year. In 1874 he entered the University of Dorpat (Tartu or yet Yuriev).

From 1875-1877 he travelled through Colombia. Details of his travels are not known.

Upon his return he studied his scientific materials in England and Germany, returning in 1878 to Dorpat, where he proceeded with his studies at the University. In the meantime he made excursions to Lapland.

Receiving his degree of "candidate of zoology" in 1879, in 1880 he travelled to Turkmenia and northern Persia. In 1881 he was laureated and sent by the Russian Society of Geography to the Transcaucasia and Armenia. In 1884 he was offered a chair of natural history and geography in Revel. His M.A. degree was obtained in Dorpat, in 1887. Finally, in 1890, he was named director of a school in Revel, where he remained until 1915, making several excursions in Asia and Europe.

In 1917 he retired to his country house in Revel, where he dedicated himself exclusively to scientific works. In 1929 he received the title of "Doctor Honoris Causa" by the University of Königsberg, because of his numerous works on entomology and biology. He died on 3 February 1933 (Kusnezov, 1937).

### Poepig

EDUARD FRIEDRICH POEPPIG was born in Plauen, Sachsen, Germany, on 16 July 1798. His basic studies were made at Leipzig and Grimma, and afterwards he studied medicine and natural history in Leipzig (1815-1822), where he received, in 1822, his Dr. med. degree.

In 1822 he travelled to Cuba, which he explored until 1824, especially the localities of Matanzas, Limonar (Lemonal), Loma de Caverna, Sumidero, Cahoba, S. Anna-Cavalleros, S. Elena, the Sabanasso Mt., and the *Laguna de las Piedras*. From 1824 to 1826 he visited Pennsylvania, from 1827-1829 Chile, from 1829-1832 Peru and the Amazonas, and embarked on October 1832 from Belém (Pará) to Europe.

In 1833 he became "ausserördentlicher Professor" in Leipzig, and published on the plants collected in Chile. From 1835 to 1845, with S. Endlicher, he published the botanical results of his trips through Peru, Chile, and Amazonia. In 1834 he became the director of the zoological museum of Leipzig. From 1835 to 1836 his books of travels were published. He was named "ordentlicher Professor der Zoologie" in 1846. He died on 4 September 1868 in his villa in Wahren bei Leipzig (Urban, 1903: 103).

### Rengger

JOHANN RUDOLPH RENNGER VON BRUGG was born in Baden im Aargau on January 1795. His parents were Samuel Rengger, minister of the Reformed Church of Baden, and Rosina Keller. Johann lost his mother when 3 years old, and his father in 1802. His father was at the time of his death the minister of Zimmerwald, canton of Berne. Rengger's education was continued under his uncle, Albrecht Rengger, Minister of the Interior of the Helvetic Republic. Johann Rengger spent eight years in a private school in Berne, and during six years in Aarau (October 1805-Spring 1812) he frequented a private gymnasium. Having finished his studies in May 1812, he went to Lausanne, where he lived with his uncle, and there, for two years, learned French. His intention was to study medicine, and at length he frequented the classes of mathematics and natural history.

During the Lent of 1814 he visited the University of Tübingen, and there frequented the lectures of Altenrieth, Kielmeyer, Gmelin, and Emmert, which gave him a scientific background. There he followed medicine courses, and in the spare time studied natural history (especially insects), and anatomy and physiology of animals. In 1817 he defended his thesis, called "Physiologische Untersuchungen über die thierische Haushaltung der Insecten", receiving his degree of "Dr. med." by the University of Tübingen. He then returned to his native place.

Some weeks afterwards, during the winter of 1818, he visited the scientific institutions of Paris. There he decided to go to South America to study natural history. In the company of a Dr. Longchamp, a Swiss from Waadt, which he had already met in Lausanne, he embarked at Le Havre on May 1818, for Buenos Aires.

During the voyage he dissected fishes and marine birds. In a letter addressed to Altenrieth, dated from Buenos Aires, 15 July 1818, he described the work done on board the ship.

He landed in Buenos Aires on 1 July 1818, there meeting Bonpland (see Vol. I, pp. 41-43), with whom he became a friend. Rengger and Longchamp explored the surrounding areas, visited the "pampas", especially collecting birds. Due to the war situation, they were not able to proceed to Paraguay, as was formerly intended. Finally, that opportunity was offered, and they embarked on the *Rio de la Plata* on 8 August 1818.

While ascending the *Paraná* they were much molested by the revolutionaries, which tried several times to force them to surrender their weapons. After seven weeks of a troubled voyage, they reached Corrientes (SG-21, 27-59d), then practically destroyed by the roops. There they had to stop, as the ports above the river were closed. Rengger and Longchamp were very well treated by the Indians and military chiefs. They were forced by the situation to stay in Corrientes for 8 months (until March 1819), and were very useful, since they were the only medical doctors available around the town. Collecting trips were organized in the surroundings, but not very far from Corrientes, due to the war. Anyway, a few vertebrates, some hundreds of beetles, and one jaguar, were obtained. They also explored some islands on the *Paraná River*.

At length navigation was reopened, the Indians left the town, and commerce with Paraguay was reestablished. At the first opportunity (July 1819) Rengger and Longchamp resumed their trip, going up the *Paraguay River*, and stopping in several places to collect.

On 30 July 1819 they reached Asunción. After so many fights and wars beheld during the trip, Paraguay seemed to be a peaceful haven — it was the only place with no revolutions. Several families were migrating there, to escape the persecution by Artigas, in Argentina. Rengger had at first a very good impression of the government of Dictador Francia, but was very soon disillusioned by the local families and by a British doctor, Dr. Parlet, who told them about the real situation of the country under Francia's dictatorship.

Rengger and Longchamp lived under Francia's regime during 6 long years. They practised medicine and avoided politics in every possible way. Every time Rengger went to collect in the interior he needed a special permission, and had to report to the authorities once back to the capital. Later they would become the army medical doctors.

Rengger established his headquarters in Asunción, exploring the surroundings, and later several regions in the interior:

1. From 12 November 1819 to 14 January 1820 — Yaguandaneyu, on the river Xejuy, ascending the *Paraguay* to the confluence, and returning by the same way;
2. From 28 March to 14 April 1820 — he explored the valley of the *Piray*, south of the Cordillera;
3. From 24 September to 22 November 1820 — he went to Villarrica and Yhu, east of Asunción;
4. From 28 March to 14 June 1821 he investigated the southern regions of Paraguay;
5. From 22 October to 22 December 1821 he explored the mountains of Maracayu, which divide the valleys of the *Paraná* and *Paraguay*, visiting a plantation of "mate".

As to his other trips, there are no data, since his journals were lost in Europe. It is said, however, that he did not visit only the eastern, uninhabited part of Paraguay.

During his residence in Paraguay Rengger collected in all fields of natural history. But, most unfortunately, the collections left in Asunción during each of his trips were partly destroyed by fungi, dermestids and cockroaches, as they could not be sent abroad. There was shortage of paper, and he could only draw the plants, drying the smaller specimens between the leaves of some books. He was able to prepare, however, collections of

skulls and skeletons. He also kept a small zoo, in order to observe the habits of the animals.

On 25 March 1825 Rengger and Longchamp had Francia's permission to abandon the country. The notice was given them a few hours before departure — the ship of Don José Thomás Ysasi would leave for Buenos Aires at 1 P.M. of that same day. Rengger and Longchamp had to hurry up, leaving behind some amount of money, and part of the collections. They were able to transport with them the skeletons of the smaller mammals, the skulls of the larger mammals, some skeletons of birds, and all the remaining insects. The greatest part of the collections, including the reptiles preserved in alcohol, remained in Asunción, in the care of a certain Sauguier, a French merchant.

They arrived in Buenos Aires in the middle of July, and embarked for Europe in October. After 42 days of voyage the ship had to stop at Salvador, Bahia (Brazil), as she was making water. There they moved to a French ship, bound for Recife, Pernambuco. In Recife they met an old acquaintance, Mr. Ricou, from Lausanne, who was the Swiss consul in Pernambuco, and in whose residence they were received.

On 21 January 1826 they left Brazil, arriving at Le Havre on 25 February. From Le Havre Rengger and Longchamp went to Paris, where Humboldt and Cuvier became very interested in the result of their travels. They spoke about the prison of Bonpland, and about the situation of Paraguay.

From Paris Rengger went to Aarau, on 16 March, where his uncle and one of his married sisters were living.

In Europe Rengger made several trips, and in the spring of 1830 went to the Rhine, especially to visit Prince Maximilian zu Wied-Neuwied, but upon arriving there he learned that the prince was travelling. Rengger's intention was to handle over the birds to Wied-Neuwied, to be included in the prince's work on Brazilian birds.

During the autumn of 1830 he decided to establish himself as a medical doctor in Aarau. However, the old Countess von Worcell requested his services as doctor and private secretary to accompany her in her trips. They went to Naples, where the countess spent the winters. On 15 February 1832 Rengger contracted pneumonia, and his health started to decline. In May he went to Pisa, and with the countess started to travel to several places to get some cure. They ended up in Switzerland again, and he was still worse. He went then to Aarau, to join his family. In the morning of 9 October 1832 he died.

His sparse notes on the trip to Paraguay were edited by his uncle, Albrecht Renger, in 1835.

### Schomburgk

ROBERT HERMANN SCHOMBURGK was born in Freiburg an der Unstrut, Prussia, on 5 June 1804, son of the minister Richard Schomburgk, and died on March 1865. His education was made at Voigstaedt, in Thüringen, where his father exercised his ministry. Later he was sent to a merchant in Naumburg, where he learned commerce. He then went to the United States, first to New York, and later to Richmond, Virginia, where he became associated with a merchant on tobacco.

In 1830 he moved to Anegada, W.I., where he became established for a while. As that island was surrounded by shallow banks, rendering navigation very dangerous, Schomburgk decided to undertake a careful survey of the area, sending the results to the Geographical Society of London, which marvelled at the knowledge of a private person who had done such a thorough job without special scientific instruments and formation. The Society decided then to employ him to explore Guyana. From 1834 to 1839 Schomburgk explored that British colony, and left Georgetown in 1839, for Europe. He carried with him valuable collections of animals and plants, including notorious new plants, such as the *Victoria regia*. He had established the geographical position of most localities in Guyana.

Upon his return he was charged by the British Government to establish the frontiers of Guyana with Brazil, and to complete the survey and observations made during his first trip.

He left Germany, where he was having a merited few months' rest, and on December 1840 embarked once more to Guyana. After having explored the Essequibo and the Orinoco, he returned to England in 1844, where he was knighted by the Queen, receiving also a permanent job in the Ministry of Colonies.

In addition to his botanical work, he dedicated himself to linguistics, having devised a system of writing in Latin characters languages that did not have an alphabet; this system was presented to the British Association in 1848.

He was next named consul in the Dominican Republic, where he established several commercial contracts with England. During his last years he dedicated himself with geographical works related to the Dominican Republic (Enc.; Urban, 1903: 121; Schomburgk, 1822-23).

### Steinheil

EDUARD STEINHEIL was born in Munich, on 9 November 1830, and died in 1879. A lengthy biography of him was published by Forel (1879).

From 1872 to 1873, for reasons of health, combined with scientific interests, he undertook a collecting trip to Colombia, visiting more or less the same localities as Baron von Nolcken (see above). His itinerary was the following:

- 2-26 October 1872. Trip from Sabanilla to Bogotá: Barranquilla, Nare, and Honda;
- 26 October to 16 November — First stay in Bogotá (2,700 m);
- 17-23 November — Ubaque (1,883 m);
- 24 November to 5 December — Second stay in Bogotá;
- 8-16 December — La Luzera (2,942 m);
- 18-27 December — Muzo (847 m) and neighborhood;
- 31 December 1872 to 30 January 1873 — Third stay in Bogotá;
- 30 January to 1 February — From Bogotá to Ambalema (226 m): Viani;
- 21 February — Guyabal (2,036 m), Las Tápias (1,708 m), Las Cruces (2,497 m);
- 22-25 February — Maguanal (2,469 m), Las Pavas (1,708 m), Piedra de Moler (991 m);
- 29 February to 2 March — From Cartago to Manizales: Santa Rosa;
- 3-5 March — Manizales (2,187 m);
- 13-28 March — Medellín (1,519 m);
- 29 March-8 April — From Medellín to Mare: Rio Negro (2,126 m), Peñol (1,916 m), San Carlos (998 m), Cañas (807 m);
- 8-12 April — Mare (79 m); and trip back to Barranquilla.

Details on his trip were published by him in *Petermann's Geographische Mitteilungen*, vols. of 1876-1877

He obtained a good collections of insects during his brief stay, having paid more attention to the Coleoptera. Papers describing the Coleoptera gathered by Steinheil were published, among others, by Jacoby (1878), Lefèvre (1878), Putzeys (1878), Harold (1880), and Bourgeois (1879).

### Sintenis

PAUL ERNEST SINTENIS was born in Seidenberg in der Oberlausitz (Prussia) on 4 June 1847. His basic studies were made at the gymnasium of Görlitz, and later he studied pharmacy, from 1877-1879, in Breslau.

He collected in Smirna and Rhodes in 1880, then in Austria (1881), and Italy. From October 1884 to June 1887, he travelled extensively in Puerto Rico, collecting for the Consul L. Krug (see above). In 1884 (from October on) in Mayaguez and Maricao, in 1885 in Cabo Rojo, Bayamon, Fajardo, Cabeza de San Juan, in the Serra de Naguabo, Sierra de Luquillo, the Monte Yunque (13-14 July), Yabucoa, Sierra de Juncos, Hato Grande, Caguas, Aguas Buenas, Guayama, Cayey, Aibonito, Barranquitas, Coamo, Juana Diaz; in 1886 he visited Coamo, Ponce, Guayanilla, Adjuntas, Yauco, Sabana Grande, San German, Guanica, Utuado, Jayuya, Adjuntas, Peñuelas, Guyanilla, Ponce, Patillas, Maunabo, Yabucoa, Sierra de Naguabo, Sierra de las Piedras, Rincon, Añasco, Aguada, Aguadilla; in 1887 Lares, Pepino, Las Marias, Utuado, Camuy, Hatillo, Arecibo, Manati, Barceloneta, Ciales, Vega Baja, Morovis, Dorado, Mayaguez and on the way home St. Thomas (June 1887).

In Europe he dedicated himself to botanical studies and collecting trips, especially in eastern Europe and western Asia, Greece, and the Middle East (Urban, 1903: 127).

### Stübel

Unfortunately nothing is known about the life of ALPHONS STÜBEL, one of the greatest travellers and collectors in South America. From 1868 to 1877 he travelled around South America, studying geology, especially volcanoes.

Arriving in Santa Marta, Colombia, in 1868, he went to Barranquilla, ascended the *Magdalena River* to Honda, proceeding overland to Bogotá; after exploring the surroundings, he went to the southwest, through the Departments of Cundinamarca, Tolima, Huila, Cauca and Nariño, entering Ecuador. From February 1870 to September 1874 he explored the western parts of Ecuador, and from Quito went to visit the several mountains of the area. Sailing from Guayaquil to Lima (October 1874), he proceeded overland, through the Provinces of Lima, Ancash, La Libertad,

Cajamarca, Amazonas and San Martín, to the *Huallaga River*, which he ascended to its mouth in the *Amazons*. He descended the *Amazons* to Belém (Pará), Brazil, explored the *Tocantins*, and then sailed from Belém, stopping at Rio de Janeiro (Guanabara) and Florianópolis (Santa Catarina), finally landing in Buenos Aires. From the Argentinian capital he followed overland to Mendoza, crossed the Andes to Valparaiso, where he embarked again and went to Arica, northern Chile, proceeding overland to Tacna, southern Peru, whence he followed to La Paz, Bolivia, exploring that country for some time.

No other details about his life are known. However, we have a very detailed itinerary of his travels, published by Weymer & Maassen (1890), which is presented in the sequence.

## I. COLOMBIA

### A. Stay in the coast and trip to Bogotá

1. Santa Marta (Magdalena; NC-18, 74a) and neighborhood; 27 January to 14 February 1868;
2. Excursion to the mud volcanoes of the *Ensenada de Galera Zamba* (NC-18, 11-75c); 15-28 February 1868;
3. Voyage from Barranquilla (Atlántico, NC-18, 11-75d) to Honda (Tolima; NB-18, 5-75b), up the *Magdalena River* (NB-18, 8-74b; NC-18, 10-74d); 3-13 March 1868;
4. Honda (Tolima; NB-18, 5-75b) and excursion to Santa Ana (?); 14-25 March 1868;
5. Trip from Honda to Bogotá (Cundinamarca; NB-18, 5-74c, 5-75d); 25-28 March 1868, 1500-2000 m; most of the specimens were captured at an elevation of 1000 m.

### B. Bogotá and excursions to the Departments of Cundinamarca and Boyacá

1. Bogotá and neighborhood, 30 March to 9 June 1868; 2600-3000 m;
2. Excursion to the *Tequendama Falls* (NB-18, 5-74c), and San Antonio (Cundinamarca; NB-18, 5-74a), 10-13 June 1868; eastern slopes of the Cordillera, where Bogotá is located, 1500-2800 m;

3. Excursion to Fusagasugá (NB-18, 4-74a), and Pandi (NB-18, 4-74a), 22-27 June, 1868; eastern slopes of the Cordillera de Bogotá, 800-2000 m;
4. Excursion to Zipaquirá (Cundinamarca; NB-18, 5-74a), Muzo (Boyacá; NB-18, 6-74c), and Chiquinquirá (Boyacá; NB-18, 6-74d), 5-13 July 1868; 800-1500 m;
5. Excursion to the Llanos de San Martín (NA-18, 4-74d), 24 August to 23 September 1868; 500-1500 m;
6. Bogotá.

#### C. Trip from Bogotá to Popayán

1. From Bogotá to Ibagué (Tolima; NB-18, 4-75a), 25 September to 1 November 1868 (collected nothing);
2. Excursion to the Tolima (Tolima; NA-18, NB-18, 4-75a), 6-14 November 1868;
- 3-4. Road to Neiva (Huila; NA-18, 3-75c) and excursion to the Cerro Pelado (Huila; NA-18, 2-76a), 21 November to 14 December 1868;
5. Excursion to San Agustín (Huila; NA-18, 2-76c), 15-31 December 1868;
6. From La Plata (Huila; NA-18, 2-76b) to Tierradentro (?) and Popayán (Cauca; NA-18, 2-77b), 9 January to 3 February 1869.

#### D. Popayán and trip to the neighborhoods (February to June 1869)

1. Popayán (Cauca; NA-18, 2-77b), 1500-2500 m; mostly 1800 m;
2. Excursion to the Volcán Huila (Nevado del Huila; Huila; NA-18, 3-76d), 25 February to 23 March 1869;
3. Excursion to the Volcán Sotará (Cauca; NA-18, 2-77b), 24 April to 6 May 1869.

#### E. Trip from Popayán to Pasto (Nariño; NA-18, 1-77a), 1-14 July 1869.

#### F. Stay in Pasto and visit to surrounding mountains

1. Pasto (Nariño; NA-18, 1-77a) and neighborhoods;
2. Two excursions to the Volcán de Pasto (NA-18, 1-77a), 22 September to 12 October 1869;

3. Excursion to Laguna Grande (?) and to the Cerro Patascoy (NA-18, 1-77a; = Patascoy de Putumayo, Nariño);
4. Excursion to Sebondoy (?), 25 November to 11 December 1869.

G. Trip from Pasto to Cumbal

1. From Pasto (Nariño; NA-18, 1-77a) to Tuquerres (Nariño; NA-18, 1-78b), 13-15 January 1870;
2. Excursion to the Volcán Azufral (Nariño; NA-18, 1-78b), 19-23 January 1870;
3. From Tuquerres (NA-18, 1-78b) to Cumbal (Nevado de Cumbal, Nariño; NA-18, 1-78d), 27-28 January 1870.

H. Stay in Cumbal and visit to the nearby volcanic mountains (29 January to 15 February 1870).

## II. ECUADOR

A. Excursion to Mindo (SA-17, 0-79d), in the western slopes of the western Cordillera of Quito, especially to the Pichincha (SA-17, 0-79d), 22 June to 7 July 1870.

B. Excursion to the Province of Imbabura (18 November 1870 to 5 April 1871)

1. Cunru (?), 3300 m;
2. Páramo de Cuvilche (?), 3800 m;
3. Ibarra (NA-17, 0-78a), 2300 m;
4. Injenio (?), 2100 m;
5. Cerro Cusin (NA-17, 0-78a), 3300 m;
6. Loma de Canamballa (?), near Ibarra, 2370 m;
7. La Magdalena (?), 2700 m;
8. Laguna de Cuicocha (NA-17, 0-76a), 3100 m;
9. Páramos de Piñán (NA-17, 1-78c), 4000 m;
10. Páramos de Mojanda (NA-17, 0-78a), 3800 m;
11. Cotacachi (NA-17, 0-78a), 2435 m.

C. Excursion to the eastern Cordillera of Quito (September to October 1870; May to September 1874)

1. Antisana (SA-17, 1-78a), 4000 m;
2. Mutadero, Cerro Sincholagua (SA-17, 1-78a);

3. Putzulahua (SA-17, 1-79b), 3600 m, near Latacunga (SA-17, 1-79b);
4. Hacienda Chántag (?), 2700 m;
5. Antisana, Paso de Guamaní (SA-17, 0-78c), 3600 m;
6. Cerro de Quilindaña (SA-17, SA-18, 1-78a), in the Cordillera de Chalupas (SA-17, 1-78c), 3700 m;
7. Chuspichupa (?); 4000 m;
8. Cimaronas (?), Antisana, 4000 m;

D. Quito and neighborhood (April to June 1871; May, June, October to December 1873)

1. Pichincha (SA-17, 0-79d), 3600 m;
2. Quito (SA-17, 0-79d), 2850 m;
3. Páramo de Calacalí (?), 3600 m;
4. Páramos de Mojanda, (NA-17, 0-78a).

E. Riobamba and neighborhood

a. Excursion to the Cerro del Altar (SA-17, 2-78a), Tungurahua (SA-17, 1-78c), etc. (October to November 1872; November 1873)

1. Taguche (?), near *Río Puela* (SA-17, 2-78a) 2550 m;
2. Utañag (?), 3000 m;
3. Minza (?), Tungurahua (SA-17, 1-78c), 3800 m;
4. Collanes (?), Cerro del Altar (SA-17, 2-78a).

b. Excursion to the Páramo de Alao (?) (December, 1873), and to Calcipungo (?), 4100 m.

c. Surroundings of Riobamba (SA-17, 2-79b) and Chimborazo (SA-17, 1-79d) (April to December 1872)

1. Pallatanga (SA-17, 2-79b), 2200 m;
2. Cuicui (?). on the Chimborazo (SA-17, 1-79d) 3700 m;
3. Riobamba (SA-17, 2-79b);
4. Cerro Llimpi (?), 3200 m;
5. Chimborazo, 4000 m.

F. Excursion from Riobamba to Baños and Jivaria del Pintuc (?) (January to February 1873)

1. Baños (SA-17, 1-78c; Tungurahua), 1800 m;
2. Road from Baños to Píntuc (? Pintac; SA-17, 0-78c), 1000-1500 m;
3. Runtun (?), 2300 m;
4. Agoyán (?), 1600 m;
5. *Río Allpayacu* (?), 1057 m;
6. *Río Topo* (SA-18, 1-78c), 1200 m;
7. El Pintado (?);
8. Santa Inés (SA-17, 0-79d), 1244 m.

G. Excursion from Quito to the Cerro Pululagua (9-28 July 1873)

1. Cerro Pululagua (NA-17, 0-79b), 2500-2700 m;
2. Hacienda Pululagua (?);
3. El Pailón (NA-17, 1-79b).

H. Excursion from Quito to San Florencio (?) (on the road to the Province of Manabí), western slopes of the western Cordillera de Quito, 20 September to 2 October 1873.

I. Excursion from Quito to Illiniza, the Cerros de Chaupi and Quilotoa (January 1874)

1. Guantachaló (?);
2. Quilotoa (?);
3. *Río Toachi valley* (Pichincha; NA-17, 0-79a; SA-17, 0-79c; SA-17, 1-79a);
4. Cerro Illiniza (SA-17, 1-79b), 4000-5000 m;
5. Chaupi (?), 3200-3400 m.

K. Surroundings of Huamboya (Cordillera de; SA-17, 2-78a), eastern slopes of the eastern Cordillera de Latacunga (SA-17, 1-79b) and Pillaro (SA-17, 1-78c).

L. Coast of Ecuador: Guayaquil (SA-17, 2-80d), *Río Dulce* (?), Chonana (?), Pajonales (?) (September 1874).

### III. PERU

A. Lima and surroundings (October 1874 to March 1875)

1. Lima (SD-18, 12-77c);
2. Iquique (?);

B. Trip to the *Amazons River*

a. From Pacasmayo (La Libertad; SB-17, 7-80d) to Cajamarca (Cajamarca; SB-17, SB-18, 7-78c) (April 1875)

1. La Viña (Cajamarca; SB-17, 7-78a);
2. Cajamarca (Cajamarca; SB-17, SB-18, 7-78c), and Los Baños (?). 2678 m.

b. From Cajamarca to Chachapoyas (29 April to 14 June 1875)

1. Cuelap (Cajamarca; SB-18, 6-78d), 2400 m;
2. Páramo de Celendín (Cajamarca; SB-17, 7-78a) (4 May 1875), 3000-36000 m;
3. Chachapoyas (Amazonas; SB-18, 6-78d). 2343 m;
4. Tambo de Chillo (SB-18, 6-78d) (5 May 1875), 3000-3600 m;
5. *Río Canizal* (?), 2151 m;
6. *Río Utcubamba* (Amazonas; SB-18, 6-78d), 2000 m;
7. Tambo de Chiles (?).

c. From Chachapoyas through Molinobamba to Tambo Almirante (15-19 June 1875)

1. Cuesta de Lejia (?), 2300 m;
2. Cuchilla (?), between Sigsí (?) and Ventilla (Amazonas; SB-18, 6-78d). 2600 m;
3. *Río Sonche valley* (SB-18, 6-78d), 2300 m;
4. Puente de Sigsí (?), 2500 m;
5. Molinobamba (= Molinopampa; SB-18, 6-78d), 2100-2400 m.

d. From Tambo Almirante (SB-18, 6-77c) to Pucatambo (?) (20 June, 1875), 1500-2000 m.

e. From Pucatambo (?) to *Río Negro* (San Martín; SB-18, 6-77a) and *Rioja* (San Martín; SB-18, 6-77c) (21-22 June 1875), 860-1470 m.

f. From Rioja (SB-18, 6-77c) to Moyobamba (San Martín; SB-18, 6-77d) and neighborhood of Moyobamba (23 June to 10 July 1875), 750-850 m.



Hunting "emas" in a cerrado (Rugendas)



- g. From Moyobamba (SB-18, 6-77d) to Tarapoto (San Martín; SB-18, 7-76a) (11-17 July 1875), 300-1000 m.
- h. From Tarapoto (SB-18, 7-76a) to Chasuta (San Martín; SB-18, 7-76a). Navigation of *Río Huallaga*.
- i. Voyage up the *Río Huallaga* to the *Amazonas River*, down to Iquitos (SA-18, 4-73a), and neighborhood of Iquitos (30 July to 9 September 1875), 100-150 m.

#### IV. BRAZIL

- A. Voyage down the *Amazons* to Belém (Pará). Surroundings of Belém; voyage up the *Tocantins* (22 September to 3 November 1875), until Baião.
- B. Rio de Janeiro (Guanabara) and Florianópolis (Santa Catarina).

#### V. ARGENTINA

From Buenos Aires, overland, to Mendoza (for probable itinerary, see trip of La Touanne, Vol. I, p. 132). [From Mendoza Stübel must have crossed the Andes, reaching Valparaiso in Chile, where he embarked to Arica, Tarapacá, Chile, following overland to Tacna, in Peru].

#### VI. BOLIVIA

- A. Trip from Tacna (Peru) to La Paz (October to December 1876)

1. Sajama (Oruro; SE-19, 18-69d);
2. Oruro (Oruro; SE-19, 18-67a);
3. Sicasica (La Paz; SE-19, 17-68d);
4. Corocoro (La Paz; SE-19, 17-69d);
5. La Paz (La Paz; SE-19, 16-68c) and neighborhood;
6. Road to Cotaña (SE-19, 19-69b);
7. Northeastern slopes of the Nevado de Illimani (SE-19, 17-68b);

8. Tiahuanaco (SE-19, 17-69b);
9. Lake Titicaca (SD-19, SE-19, 16-69c).

#### B. Excursion to the Yungas (2200-1200 m)

1. Road from Cotaña (SE-19, 19-69b) to the valley of the *Río de La Paz* (?) to Yrupana (= Irupana; SE-19, 16-67c) and Yanacachi (SE-19, 16-68d) (9-15 December 1876).
2. Road from Yanacachi to the valley of the *Río Pongo* (SE-19, 17-67c) to San Felipe (?) (16 December 1876), 2000-2600 m.

#### Thieme

OTTO THIEME was born on 24 January 1857 in Oldisleben, in the "Grossherzogthum" of Sachsen-Weimar. His father was a minister, and gave to Otto his primary education. His gymnasium was made at Eisleben. During the spare hours he dedicated himself to the capture and study of insects, especially butterflies. He frequented the universities of Jena and Leipzig, and later became "Oberlehrer und Professor" at the Sophien Real Gymnasium in Berlin, occupying this position until his death, on 1 July 1907.

He undertook a trip to South America, visiting the *Amazons Valley* and the *Cordilleras* (?). No other details are known (Ziegler, 1907).

#### Other collectors

I was not able to find informations about the life and travels of the following other collectors cited in the German literature: Haeberlin, Kaaden, Koeppen (Mexico), Alexander Lindig (? Colombia), Hans Frühstorfer (1863-1922), Müller (Cuba), Thorey, Uhde (or Uhle ; Mexico).

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## *Chapter XVI*

# German and Austrian dipterists

### **F. M. Brauer**

Friedrich Moritz Brauer was born on 12 May 1832 in Vienna (Mariahilferstrasse 335), the son of Justus Brauer and his second wife Louise Braun, from Hannover. The house where Brauer was born, now in the commercial center of Vienna, was at that time the cottage of the family, which actually resided in the center of Vienna. In the gardens and wells of his home, Brauer started to observe the biology of insects, noting their metamorphosis; he reared mosquitoes in vials.

In 1838 he had as teacher of drawing Anton Löw, which also had the habit to collect insects, and with him Brauer learned the collecting techniques. His father and his uncle Daniel Braun, as well as his brother Theodor, were also fond of entomology. Thus Friedrich had very early his tastes inclined to that field of zoology.

Upon his father's death in 1839, the family spent a last summer in Mariahilferstrasse, as the following year they moved to Germany, where they lived with some relatives. In 1841 they rented a cottage in Döbling. There Brauer started excursions with Löw, especially in Krottentoch and Kallenberg. In 1842 his mother married again, with Dr. Victor Ivanchich. Summers were

then spent in Brühl, where Friedrich frequently hunted insects in the company of Löw.

In 1845 Brauer was introduced to Gustav Gözsys, which at that time frequented the second grade in the gymnasium. Gözsys' father, the medical doctor of the Brauer family since 1842, convinced them to let Friedrich frequent the public school, for which he was prepared by private teachers since 1843. So it was done. Brauer entered the school of the "Piaristen", after passing examinations. He suffered bad moments, however, for until then he had not had contact with other children of his age. In 1846, being in the third grade in the gymnasium, he was given a small collection of exotic insects, which he proposed to identify. He was introduced to the then curator of insects in the Hofsmuseum, Vincenz Kollar, by his uncle Daniel, with whom Kollar had relations. From then on, Friedrich began to frequent the collections of the Vienna Hofsmuseum, thus obtaining a good knowledge of all the orders of insects. By that time he received Burmeister's "Handbuch der Entomologie", which he studied assiduously, in spite of the fact that he could not assimilate quite a few things, due to his age.

Thus Brauer spent his time, collecting and studying insects, until the political crisis of 1848, which affected his family. In this same year, the gymnasium where he studied suffered many reforms in the teaching methods, which brought him great difficulties. Precociously interested in research, he had no taste for the regular courses at school. By that time he also became interested in the biology of Odonata, and in 1850 printed his first paper on the subject, in the annals of the "Gesellschaft der Freunde der Naturwissenschaft" of Vienna, through the good efforts of Georg Frauenfeld, whom he had previously met. Enthusiasmed with his first success, he dedicated himself to the study of insect metamorphosis, especially of the Neuropteroidea, a subject which he would investigate for many years to come.

From July to September 1850 he travelled with his family to Adelsberg, Trieste, Venice, and Tyrol. As in his gymnasium his fame of naturalist brought jealousy, he changed of school.

In March 1852 he was not able to pass the "matura" exams; in September of the same year he again tried, with the same result. His family decided then to take some providences, and applied directly to the Minister of Education, requiring another chance; a boy with published papers, accepted by the Royal Academy of Vienna and other scientific associations, they noted, could not depend on an examination to proceed in his career. The new chance was granted, and after passing examinations on

mathematics and Latin, Brauer entered the University, to follow the course of medicine. He was given at that occasion Westwood's "Modern classification of insects", which induced him to study English.

On May 1854 he lost his mother, and his brother Albert became his tutor. At that time he made the acquaintance of Schiner and Johann Egger. Schiner was not yet a dipterist, being interested in ornithology and botany. As Brauer had a reasonable collection of flies, Frauental, Egger and Shiner became interested in the systematics of the Order, and tried to identify them through the works of Meigen. In 1854 and 1855 Brauer and Egger undertook frequent excursions to collect Diptera.

In 1856 Brauer married Leontine Boschetty, whom he knew already for some years. In the same year, Karl Lang found in the Pratter a specimen of *Oestrus pictus*, and Brauer decided to start the study of the Oestroidea, beginning to compile the literature and to make field observations. Visiting the Pratter and the Imperial Zoological Garden he was able to rear several parasitic cestrids, completing his notes and studies, being helped by Rogenhofer, Zeller, and Hermann Loew.

In 1860 he published on *Oestrus hominis*, based on larvae brought from Brazil by Natterer, deposited in the Vienna Museum, erecting then the genus *Dermatobia*.

Finally, after 7 years of studies of medicine, Brauer passed the "Rigorosum", and graduated. Soon afterwards he contracted typhus, and, due to his precarious health, gave up the idea of passing a second "Rigorosum".

In October 1861 he accepted a position in the Naturalienkabinett (Vienna Museum), leaving definitely medicine to dedicate himself exclusively to natural history. However, he remained at the museum for 16 years as curator of molluscs. During that time, with J. F. Bergenstamm, he published the famous monographs on Muscoidea (1889-1894).

He also published on the higher classification of Diptera, and on the phylogeny of insects. In 1871 he obtained his doctor's degree in the faculty of philosophy, and two years later the title of "Professor Extraordinarius". With the death of Frauental (1873), Ferrari (1876) and Redtenbacher (1876), the number of members of the Museum diminished, and only then Brauer obtained a better position. He dedicated himself entirely to the study of the Diptera, identifying and organizing the collections of the Vienna Museum, which comprehended those of Winthem, Wiedemann, Egger, and Schiner.

In 1876 he was named curator of the entomological section of the Museum and made a member of the Academy of Sciences and other learned societies. From 1880 on, he started publication of his monumental work on the "Zweiflügler des Kaiserlichen Museums zu Wien". In 1884 he was made "Ordentlich Professor", and in 1888 effective member of the Academy of Sciences.

The elaboration of the "Zweiflügler" left him very little time. At that period the Naturalienkabinet was incorporated to the Hofsmuseum. He revised the collections of Robineau-Desvoidy, Rondani, and Bigot. His collaborator, Bergenstamm, was not an ideal partner, but as he had many important types, Brauer had to accept his collaboration. The great work was finished only in 1893. During this period he lost his wife and married for a second time, with Ludmila von Koenig.

With the advancement of the years he felt old and fatigued, and needed much stimulation to prepare his works. He published lesser and lesser. In 1896 he had the pleasure of describing the larva of *Cobboldia*, extracted from an Indian elephant. With the decline of his mental activities and with the death of his second wife he became amargurated.

In 1898 he was made head of the zoological sections of the Museum, but this position was reached too late in his life to introduce in the Museum the changes he expected to impose. His last paper was Mik's necrologue (1901).

He died on 29 December 1904, after much suffering, at the house of his daughter Laura, the wife of the malacologist A. Wagner (Handlirsch, 1905).

### C. E. A. Gerstaecker

Carl Eduard Adolph Gerstaecker died on 20 July 1895 at Greifswald, at the age of 67. He was educated for the medical profession and took his degree, but devoted himself to zoology, especially to entomology. For many years he was keeper of the entomological department of the Berlin Natural History Museum, and also a professor of zoology at the University of Berlin. About the year 1876, differences with the then director of the Berliner Museum induced him to resign his appointment in Berlin, and he subsequently accepted the professorship of zoology at Greifswald, which he held until his death. Gerstaecker was an industrious and thorough worker in all departments of entomology. Among his principal works may be noticed the "Arthropoda" in

the *Handbuch der Zoologie* (1863), and the same Phylum in Bronn's "Klassen und Ordnungen der Thier-Reichs".

Gerstaecker rendered infinite help to his fellow students by compiling the entomological portion of the German "Bericht" (the forerunner and subsequent contemporary of the English "Zoological Record"), from the year 1853 to 1867 (Anon., 1895a, 1895b).

Among Gerstaecker's publications are to be cited those dealing with the Acroceridae (1856), Stratiomyidae (1857), Acalyptratae (1860), parasitic flies (1868a), and his most important paper, the revision of the Mydidae (1868b).

He studied the Diptera contained in the ancient collection of Tönder Lund, in Copenhagen, and those of Westermann, in the Vienna Museum. Many of his specimens were collected by Natterer (see vol. I, pp. 80-87) in Brazil, Lacordaire (vol. I, p. 133) in French Guiana, Deppe (vol. I, pp. 103-107) in Mexico, Olfers (vol. I, p. 69) in Brazil, Burmeister (see chapter XV) in Brazil, Koeppen (see chapter XV) in Mexico, Moritz (see chapter XV) in Colombia and the West Indies, Virmond (vol. I, pp. 110, 112) in Brazil, Müller (see Chapter XV) in Cuba, Hensel (see chapter XV) in Brazil, Appun (see chapter XV) in Colombia, Ehrenberg (see chapter XV) and Uhde (see chapter XV) in Mexico. He also studied the collections organized by Bescke (see vol. I, p. 87), belonging to the coleopterist Germar.

### H. Loew

Hermann Loew was born on 19 July 1807, in Weissenfels, a short distance south of Halle, as eldest son of a functionary in the Department of Justice in the Duchy of Saxony, who afterwards became "Geheimer Regierungsrath" in Prussia. From the conventional school of Rossleben he passed to the University of Halle, where he devoted himself assiduously to various studies in mathematics, philology, and natural history, and thus laid the foundation of his many-sided capacity for the profession of teaching. In the beginning of the third decade of the 19th century he went to Berlin and gave lessons in different schools of higher grade, for some time also in the military school (Kadetten-Schule). Occasionally he held the position of a private tutor of young men. It characterizes his strength of will that, at the beginning of his career, he vowed never to touch a warm morsel until he paid off the debts contracted during the penurious years of his studies, and that he actually carried out the vow.

He was soon afterwards appointed superior teacher of the Frederick Wilhelm Gymnasium in Posen, and married there (1834) the daughter of the "Ober-Prediger" Ehricht, a favorite preacher at that time. He had made her acquaintance as a student, and for forty-five years she was for him a faithful wife and nurse. He had in Posen a large field of activity as a teacher of mathematics and natural history; at the same time he directed his attention to the study of entomology, and especially to the, at that time, much neglected Order of two-winged flies. To this specialty he remained true during his life-time, and became later on one of the first authorities on the subject. He first attracted attention by his "*Horae Anatomicae*", a work of the most minute research in the anatomy of insects, and especially of their genital organs. His next publications appeared in the so-called "Programmes" of the Friedrich-Wilhelm Gymnasium.

His long-cherished wish to make a journey of exploration to the East was finally fulfilled. He undertook it (1841-1842) in company with the celebrated geographer Kiepert, and the philologist and geographer August Schoenborn, who afterwards became his brother-in-law, but at that time was Professor in the same Institution, and known as author of several Latin school-books. Loew was unfortunately not in a position to publish the results of his journey independently. He communicated a portion of them to the entomologist Burmeister, and also to Alexander von Humboldt. The greatest part he made use of in his later publications. All his life he longed for travel in distant countries, but in this respect circumstances did not favor him.

In the midst of his labors the closing years of the first half of the 19th century brought on a period of political troubles, and found him, in the advanced post he occupied (Posen, near the frontier of Poland), an energetic champion of German nationality. German to the core, he boldly withstood the separatist longings of the Poles. The confidence of his fellow citizens in him was shown by his election to the first German Parliament in Frankfurt a. M. in 1848, when he was only forty years old. Always abstaining, according to his habit, from noisy manifestation, but all the more zealously using a latent influence, he devoted himself here untiringly to the support of Gagner's Imperial Party. The appalling news of a case of cholera in his family called him home (in the summer of 1849) from the midst of his political activity. On the very day of his forty-third anniversary, this plague carried off his eldest daughter, who had just come of age, — a grief which he never entirely got over. He soon became aware that the dream of his youth, the unity of Germany, was not to be realized at that

time, and returned in resignation to his padagogic career, and to the study of natural history.

In the meantime, his extraordinary abilities had been appreciated, and in October 1850 he was appointed Director of the "Realschule" in Meseritz, which afterwards became a Gymnasium. He found this institution in an inchoate state of development, and soon raised it, in spite of the small means at his disposal, to the rank of one of the best schools of that time. The teaching of his favorite subjects, especially mathematics and natural history, was raised to a high degree of perfection. In his method of teaching he showed real genius; far from following the usual routine, he was always suggestive and inspiring, instilling into the dullest head a glimpse of the superiority of their master. By such means he acquired in a rare degree the affection of his scholars.

Unfortunately, the reactionary tendencies which prevailed at that time prevented his merit from being appreciated as much as it deserved. And yet, absorbed by the duties of his official position and by his scientific studies, he carefully abstained from politics. In order to avoid all occasions of conflicts with his superiors in the Educational Department, he resisted repeatedly offers of a seat in the Prussian Landtag for the district of Meseritz-Bomst. In addition to the difficulties of his political position, Loew had for several years to endure bodily sufferings. When, after one of the most painful periods of his life (1851-1854), in which he suffered the torments of stone in the bladder, he returned to his duties with an expression of deep suffering on his face, but at the same time with the old energy and tenacity, hardly anyone dared to hope that he would still be able to devote twenty-five years of his life to the service of science and of his country. Although he continued to follow his calling with all the fibres of his heart, he finally felt that he could no longer endure endless annoyance, and he sent in his resignation in 1868.

In the meantime his scientific work was going on incessantly, and had earned him a universal reputation. In 1863, free from all official cares, he moved from Meseritz to Guben. Here he had plenty of time to give himself up to his favorite studies, working incessantly, and only now and then interrupting his work by scientific excursions in Germany and abroad.

The claims of public life that could not spare his many-sided knowledge and experience gradually again took possession of him. Solicited by different associations, elected a City-Councillor and Vice-President of the Council, he could not escape other engagements, and, after a long interval, he accepted a seat in the Legislature (in Berlin) for the district Sorau-Guben, and for the term

of 1873-1876. The dream of his youth was now fulfilled, and he could, with a lighter heart, than before, devote his labors to the development of the liberal institutions. He joined the National-Liberal party.

During the summer of 1876, while he was staying at Blankenburg (Thüringen) on a holiday trip, he had a first paralytic stroke. He recovered from this, but after that time these attacks on his iron constitution recurred several times, until at last his once so bright spirit yielded to the inexorable decrees of Fate. For this gifted man, after years of toil, a brighter life's evening was not to be. His grave disorder overpowered him, and he sought succour and rest in the "Diaconissinen-Haus" in Halle on the Saale, hoping thus to escape the mental derangement which he felt like a dark shadow over him. From a fresh paralytic stroke he was not to recover. Since the beginning of March, 1879, he remained confined to his bed; an exceedingly painful nephritic ailment aggravated his condition, and, in spite of the tenderest care, he expired on the 21st of April, after several days of unconsciousness. He was buried on the 24th in Halle, the place where, half a century before, in the fullness of youthful strength and spirits, he had laid the foundation of his vast scientific knowledge. Bowed down by grief, his widow and the three sons, survivors of seven children, stood around his coffin; they must have found consolation in the thought that thousands of friends, of political partisans, of naturalists, and of pupils of all classes shared their sorrow and honored his memory (Osten Sacken, 1903: 99-103).

In the interval between 1840 and 1878, Loew produced nearly 6000 octavo and 1200 quarto pages of principally descriptive work, comprising more than *four thousand* new European and exotic species (fossil Diptera not included) (Osten Sacken, 1903: 105).

### J. Mik

Josef Mik was born in Hohenstadt in Mähren on 23 March 1839. From 1850 to 1857 he studied at the Staatsgymnasium in Olmütz and after passing examinations, at the Faculty of Philosophy on 11 August 1857, he entered the University of Vienna, which he frequented from 1857 to 1861. Afterwards he worked as professor in the gymnasium of Görz (1865). After his marriage to Camilla Steininger, on 14 September 1869, he moved to

Freistadt, also working as a gymnasium teacher, and later, from 1871 on, at the gymnasium of Vienna.

He published a series of short papers on Diptera, of reduced interest to us, which he issued as "Dipterologischen Miscellen", as editor of the "Wiener entomologische Zeitung". However, it is said that he was one of the best dipterists of the time, and he was also known as a skilled botanist. From 1871 to 1897 he was a member of the Imperial and Royal Zoological and Botanical Society of Vienna. He died on 13 October 1900. The complete list of his papers was published with his necrology, by Brauer (1901).

#### V. von Roeder

Unfortunately nothing is known about the life of Victor von Roeder. He died in Hoyen, on 26 December 1910. He published two papers related to the Neotropical flies: one on the Diptera of Puerto Rico, collected by Krug (1885), and the other on the flies collected by Alphons Stübel (1886). His rich collection of Diptera was deposited in the University of Halle a. S. (Anon., 1911a, 1911b).

#### E. Rübsaamen

Ewald Rübsaamen was born on 20 May 1857 in Haardt (now Weidenau, Province of Siegen), on the margins of the Sieg, as son of Frans and Mathilde Rübsaamen. His basic studies were made at the public school in Weidenau, and later at the Royal Gymnasium of Siegen, until the end of the "Ober Sekunda". The father, owner of a factory of instruments for mountain engineering and metallurgy, wanted him to study metallurgy. For that reason, in 1875, Rübsaamen entered the Superior Technical School in Karlsruhe, to study mathematics. However, after 4 semesters, he gave up the idea, and, with his parents' consent, decided to become professor of drawing. He studied at Hilchenbach (Siegen). In 1878 he became a teacher in a public school in Steinhauserberg, in Schwen, and during the fall of the same year the main teacher of that school. In the Spring of 1879 he was granted the directorship of a private school in Siegen.

He learned by himself botany and zoology, and became especially interested in plant-galls, very little known at that time,

and in the Cecidomyiidae. Upon his father's death, he and his family moved to Berlin, so he could finish his botanical studies. His mother stimulated him to complete those studies.

In Berlin he found a job at the "Pflanzenphysiologische Institut der Landwirtschaftlichen Hochschule". From 1892 to 1893 he frequented the "Königlich Kunstschule", and after two years passed examination to become graduated. Natural history enthused him so much, that he could not think in becoming a teacher any more, and he decided to become a researcher. He found a position as volunteer in the Berliner Museum, with Möbius. Later, as research assistant, in the section of entomology. He organized the gall collection, and studied the Cecidomyiidae. He received materials collected in several regions of the world — Fedtchenko sent him the galls collected in Central Asia; Drigalski those collected in Greenland; Bornmüller, from the Balcanic peninsula, Persia, Canary Islands and Madeira. He published larger papers on the specimens sent by Uhle (?) in Brazil, and Dahle in the Bismarck Archipelago; he studied galls from Africa, Transbaikalia, Australia, etc.

From 1884 he prepared several water-colors depicting the plant galls and their agents. A collection of 100 water-colors was exposed during the International Exposition of Gardens in Hamburg, in 1897, and received the Great Golden Medal of the government of Hamburg. He also received a Golden Medal from the "Vereins zur Förderung des Gartenbaues in den Kgl. preussischen Staates", by the occasion of the 75th anniversary and Jubilaeum of that Society.

From 1897 on, he occupied several important positions in the *Phylloxera* commission. He published several important papers on zoocecidiae, some with beautiful colored plates.

Towards the end of his life he suffered much from heart and lung diseases, remaining sick for many years; he also suffered from dropsy. In 1912 he received the title of Professor, through the Ministry of Agriculture, and was elected in 1917 member of the Leopoldinischen Carolinischen Akademie der Wissenschaften in Halle.

He died on 17 March 1919, in Metternich bei Koblenz (Schaffnit, 1927).

### I. R. Schiner

Ignaz Rudolph Schiner (he signed his papers as J. R. Schiner) was born in 1813 in Fronsburg, Lower Austria, where the father

exercised the function of treasurer (Rentmeister) for the Count of Khevenhüller. In 1823 he entered the Kremser Gymnasium, and in 1831 moved to Vienna, to study law. There he became preceptor at the Royal Palace (Hofmeister), there remaining for ten years. Meanwhile he obtained his doctor's degree. With Baron Müller he travelled through Italy, France, Holland, Scotland, Belgium and Switzerland, and in the Tyrol. Upon his return to Vienna he became employed in the Library of the University. In 1848 Minister Thinfeld called him to work in the Ministry of Agriculture, and after some years he was transferred to the Ministry of Finances, where he remained until his death. Schiner did not like those jobs. During his last years he suffered much from auditive diseases. He died on 9 July 1873, being 60 years old (Frauenfeld, 1873).

Schiner published on the Diptera collected by the voyage of the Novara (1868), and several other papers on Neotropical Diptera.

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## *Caprer XVII*

### The brothers Lynch Arribálzaga

#### Félix Lynch Arribálzaga

Félix Lynch Arribálzaga was born in Buenos Aires on 3 April 1854, at the house of his paternal grandfathers. His parents were Félix F. Lynch and Doña Trinidad Arribálzaga, both Argentinians of the same city. Early in his boyhood Félix started reading every available book in the library of his parents and uncle, don Germán Frers. He spent eight years in the 'estancia' Santa Rosa, the estate of his father in the 'partido' of Baradero, Province of Buenos Aires. He received his elementary instruction from his parents. A German teacher, L. Rasp, director of a nearby college, was employed to teach him and his brother Enrique. French, German, astronomy, history, and geography until Félix was fourteen years old. He was very fond of field trips and hunting, as well as of riding. His younger brother Enrique was his companion in those trips and both liked to tame animals.

When the Lynch family returned to Buenos Aires from Baradero, Félix entered the English School of Mr. Nicholson, being at that time 15 years old. Later he went on to the Colégio Nacional. Upon his father's death in 1872, he employed himself in the "Banco de la Provincia", and had a teacher to give him lessons in mathematics and drawing. He then passed examinations

to enter the University in the course of Engineering. His studies were interrupted in 1874 because of the Civil War of September, for which he had a strong distaste, and he migrated to Paraguay.

Before leaving for Paraguay, Félix read the entomological writings of Buffon, Cuvier, and Latreille, and had started with his brother Enrique an entomological collection. In the several months spent in Paraguay he became imbued with enthusiasm for the tropical fauna, and decided to follow the study of nature. His brother having acquired the works of Blanchard, Girard, and Lacordaire, they started the systematic study of entomology.

About that time Félix met two outstanding naturalists — Eduardo L. Holmberg, a medical student at the epoch, about the same age as Félix, and with whom he exchanged correspondence and information until his death, and Hermann Burmeister who, in spite of his difficult character, gave much help to him. Both helped Félix, giving him access to the collections and library of the Argentinian Museum of Natural History. Félix also had excellent relations with the director of the La Plata Museum, Francisco P. Moreno, and with Carlos Bruch, who offered to publish Félix's papers and the engravings on mosquitoes in the Museum's journal. His brother Enrique always sent him insects, and both exchanged letters and drawings.

Félix married in 1877, at the age of 23, and moved to Baradero in order to administrate his mother's 'estancia', at the same time occupying himself with the study of the systematics and ethology of the *Mutillidae*. This paper was submitted to the Argentinian Academy of Letters, Sciences, and Arts, of which he was made a member on 30 March 1878, and was the first paper published by an Argentinian on entomology.

With the help of his paternal grandfather, Félix established his own farm in the 'partido' of Chacabuco, called 'Estancia Nueva Santa Rosa', and in the spare time left by his agricultural work he studied insects. His contacts with other entomologists were made through correspondence, which he maintained with his brother, Holmberg, Berg, Williston, Sharp, Fauvel, and Lapouge.

His first publication on Diptera date from that time, inaugurated by a paper describing three new *Culicidae* (1878a), and continuing with other articles on *Anthrax* and other *Bombyliidae* of the 'partido' of Baradero (1878b), as well as on the *Empididae* and *Bibionidae* of the same region (1878c, 1878d). After those papers, his attention was turned to the *Hymenoptera* and *Coleoptera*.



Serra do Ouro Branco, State of Minas Gerais (Rugendas)



In 1890 he again published on Diptera, this time on Mycetophilidae (1890a, 1890b), the 'Dipterología Argentina' (1890c), as well as monographs on Syrphidae (1891-92), and Chironomidae (1892b). His two last publications on Diptera were related to the genus *Sapromyza* in America (1893), and a conference on flies (1889).

In 1880 he went to Montevideo for reasons of health. During the political crisis of 1889-90, he sold his properties at a great disadvantage. With many economic and sentimental problems, he travelled frequently through the interior of the Argentinian Republic, going to Córdoba, Mendoza, and Jujuy, during 1892 and 1893. At the end of 1893 the post of Governor of Jujuy having been denied to him, he became so disappointed that he decided to expatriate, and left for Montevideo. However, he had not the courage to remain away from his country, and returned to Argentina. Feeling that his last hour was approaching, he gave his scientific books and entomological collections to the Museo Nacional de Historia Natural in Buenos Aires.

He died on 10 April 1894, seven days after he had completed his 40th years (Dallas, 1928).

### Enrique Lynch Arribálzaga

Born in Buenos Aires on 26 August 1856, Enrique Lynch Arribálzaga soon moved to Resistencia (Chaco), where he continued his studies and started his entomological work, specializing in Diptera. His first paper is dated from 1878, and was published in "El Naturalista Argentino", a journal founded and directed by him in collaboration with E. L. Holmberg. In 1879 and 1880 he published some notes on Calliphoridae.

In 1881, in the capacity of honorary naturalist, he undertook his first scientific expedition, under the command of lieutenant-colonel L. J. Fontana, to the Chaco.

In 1882 he published a catalogue of the Diptera of the Rio de la Plata, and from 1879 to 1883 his monumental work "Asilides Argentinos", which was left incomplete.

In 1897, under the leadership of Francisco P. Moreno, he occupied the post of secretary to the commission charged with the demarcation of the Argentinian frontiers with Chile. He was a member of the Academia Nacional de Ciencias de Córdoba, of the Academia de Ciencias Exactas, Fisicas y Naturales, in Buenos Aires, honorary fellow of the Sociedad Entomologica

Argentina, and a corresponding member of the Museo de la Plata and collaborator of the Museo de Ciencias Naturales de Buenos Aires, in whose "Anales" he published most of his papers. In December 1934 he obtained the 'Bernardino Rivadavia' prize, which had been awarded for the first time.

He died at Resistencia on 28 June 1935 (A. C., 1936).

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*Chapter XVIII*

## Italian dipterists and collectors

### Camillo Rondani

Camillo Rondani (pronounced Róndani), born in Parma on 23 November 1803, was a descendant of a very old, noble family of that city, which could boast of having produced men of distinction as early as the twelfth century. Among his ancestors was a painter of some renown, Francesco Maria Rondani (1490-1548). His family had decided that Camillo should have an ecclesiastical career. However, in 1818, Rondani began to show a great interest in natural history, after having read the works of Buffon, and he discontinued his religious studies. Afterwards he entered the University of Parma, and with Giorgio Jan, with whom he learned botany, Rondani undertook several excursions, collecting insects.

During his life in the University Rondani became interested in the politics of his country. Parma was at that time a duchy governed by Marie Louise, the ex-Empress of France. After the fall of Napoleon in Waterloo, she obtained this government from the Austrians, who again had dominated Italy, since 1815. In 1831, following the example given by the revolution of the preceding year in France, which resulted in the accension to power of Louis Philippe, the Parmese rebelled against the Austrians.

Marie Louise was deposed and fled to Piacenza. The liberal party assumed the government, and one of its members, Macedonio Melloni, offered a chair of natural history to Rondani, with the opportunity of going to France, where he was to study in order to take later the professorship in his native town.

Rondani travelled to Paris, attending several lectures of the leading naturalists, especially Cuvier. However, the Austrian troops having suppressed the Parmese revolution, Rondani was forced to leave Paris and return to his native place. In Parma, he stayed for a while helping his brother in commerce. In 1833 he married, and the following year left Parma, going to live in Guardasone, where he dedicated himself to entomological pursuits.

On 17 December 1847, with the death of Marie Louise, the government of the duchy of Parma passed to Carlo Lodovico di Borbone, who assumed it with the title of Carlo II. The next year a revolution took him from power. In that same year Rondani published his first paper on exotic Diptera, a study of the Brazilian flies collected by Ghiliani.

VITTORIO GHILIANI was born in Pinerolo on 14 May 1812. At the age of twelve he was taken by his father to Lausanne, Switzerland, and left in the Collège Beauvert, where he learned the foundations of natural history. After three years in that college (1826-1828), his father brought him back to Pinerolo, and he was employed at the house of a certain Garneri, who worked with silken clothes. Garneri soon discovered the facility in drawing displayed by Ghiliani, and employed him as artist. Ghiliani, however, wanted to study natural history, and had no inclination for a commercial job. Deluding his father with a false attack of yellow fever, he was discharged from his job and went back home. His good friend Francesco Gonin was able to convince Ghiliani's father that he should study natural history, and introduced Ghiliani to Giuseppe Genè, then the director of the Museo Zoologico di Torino. Genè hired him as a naturalist of the Museum. Ghiliani's first expedition was to Sardinia, carrying out the wish of King Carlo Alberto that the Island be explored scientifically. From 1838 to 1842 Ghiliani visited Sardinia and Sicily, and from there went twice to Spain.

In 1846, a Piedmontese merchant established in Genova, Giuseppe Mussino, an amateur entomologist, decided to send a ship to Brazil, and invited Ghiliani to come on board as naturalist. For many years Mussino had been in relation with the Italian zoologists, and knew Ghiliani's ability as a collector. In the

summer of 1846 Ghiliani arrived in Belém (Pará), remaining there months collecting insects. Returning to Italy, Ghiliani travelled through the Piemonte, and continued in the Museum of Torino as assistant. He died on 27 May 1878 (Lessona, 1884).

From the collections brought from Belém by Ghiliani, Rondani described 47 new species out of the 90 which were reported by that collector. The paper was published in 1848, in Baudi and Truqui's "Studi Entomologici". Rondani cites only "Brazil" as the locality, but it is without doubt that all the species came only from Belém, as conformed by the following excerpt from Spinola (1853: 19; translation by G. Steyskal): "In 1846 this zealous naturalist embarked for Pará with the intention of remaining there for three years, penetrating into the interior of northern Brazil as far as he was able and disdaining nothing of scientific interest, but above all occupying himself indifferently with insects of all orders. His health, however, refused to allow him to accomplish his project. Having disembarked at Belém, the capital of Pará, his infirmities did not allow themselves to be set aside, and after three months of suffering, during which so many days of collecting and study were lost, he was forced to return to his native climate in order to regain his peace and continue his life".

In 1849 Carlo Alberto di Savoia declared war on Austria and took Parma with his army. Rondani left the countryside and again came to Parma, returning to the political life. He was elected deputy by Traversetolo. However, with the defeat of Novara, Parma was lost to the Austrians again, and Carlo III succeeded his father in the duchy, exercising a tyrannical rule. Rondani took refuge again in Guardasone, returning to his entomological studies. In this he was rewarded by the excellent harvest brought by Cajetano Osculati from his trip through the equatorial regions of South America, then almost entirely unknown entomologically.

CAJETANO OSCULATI was born in Vedano, Lombardia, in 1808. He had an early inclination toward the study of natural history, and travelled through many parts of the world collecting specimens. In 1830 he visited Greece, Egypt, Asia Minor, and the shores of Turkey. In 1834 he made his first voyage to South America, leaving from Le Havre, France, aboard the brig "Claire", bound for Buenos Aires. From that city he crossed Argentina, always in a westward direction, and crossing the Andes, arrived

in Valparaiso, Chile. Then, by sea, he went to Lima, Peru, went overland to Payta, returned to Callao, and again went inland to Lima, to Cobija (then belonging to Bolivia), and Valparaiso in Chile. Finally, after rounding Cape Horn he returned to Italy in 1836.

Five years later he travelled to Arabia, Armenia, Persia, and the coasts of Malabar in India. On the return of that trip, his ship, "Auguste Étienne", was destroyed by fire, and he had to move to a Dalmatian ship, the "Zoe", bound from Gibraltar to New York. He visited then the United States and Canada, and upon his return to New York took the brig "De Zaldo", and went to Jamaica. When approaching the Bermudas, a hurricane forced the crew to jettie the cargo, and Osculati changed plans, deciding to explore the equatorial regions of South America, since "there were regions where no European had laid his foot on, or only had been explored in the first half of the past [XVIII] century by some missionaries".

After traversing the Isthmus of Panama he went to Guayaquil and Quito, Ecuador. Crossing the Andes, he followed the *Rio Napo* from its sources to its mouth in the *Amazonas*, and through the latter went to Belém, capital of the then Province of Grão Belém do Pará, in the Brazilian Empire.

His itinerary was the following: he left Panama aboard the English ship "Ecuador" on 29 March 1847, arriving at Guayaquil (SA-17, 2-80d) in Ecuador, on 2 April. He collected there "miriads of aquatic insects, butterflies and small flies" at light (Osculati, 1850: 11-12). On 9 April he left Guayaquil by the *Rio Guayas* (SA-17, 2-80d), arriving at Babahoyo (SA-17, 2-79a) and the mouth of the *Rio Caracol* (SA-17, 2-79a; 10 April 1847). On 13 April he continued overland, and passing by Montalvo (SA-17, 2-79a; 16 April), *Rio Playas* (SA-17, 2-79a), Boca de Limón and Balzapamba (SA-17, 2-79a; 17 April), San Miguel (SA-17, 2-79a; 19 April), Guaranda (SA-17, 2-79b), where he collected several interesting Coleoptera (20 April), Ambato (SA-17, 2-79b), and Latacunga (SA-17, 1-79b; 26 April), he reached the Capital, Quito (SA-17, 0-79d), on the 27th. There he remained until 7 June, collecting in the company of a certain Dr. Jameson, the doctor of the city, an amateur entomologist.

Leaving Quito, he journeyed by Tumbaco (SA-17, 0-78c; 7 June 1847), *Lago de Papallacta* and Papallacta (SA-17, 0-78c; 10 June), *Rio Chalpi* (16 June), Maspo (16 June), and, crossing several rivulets, reached Baeza (SA-18, 0-78d; 19 June) and the

margins of the *Rio Bermejo* (SA-18, 1-78b), a tributary of the *Rio Quijos*, on 20 June.

On the way to the *Rio Bermejo*, his Indians had killed a bear, and in the evening of that day Osculati collected many insects, especially butterflies, wasps and flies (Bombyliidae), on the remains of the skin and flesh of the beast.

On 22 June 1847 Osculati reached the margins of the *Rio Cosanga* (SA-18, 1-78b), and following it arrived at the small *Rio Yana-Yacu* on the following day. There he camped, and entered the forest to collect, accompanied by one Indian. Upon his return, he had the sad surprise of seeing that the other Indians, his "cargueros", had fled during his absence, with many of his objects. The only Indian which had accompanied him told that he was going to capture his companions, and joined them and also fled...

Osculati was left absolutely alone at the margins of the *Cosanga*. Afraid of proceeding, he reinforced his hut and remained there until the 9th of July. His food were the animals of the region, which he was able to hunt, and wild honey. Rains fell incessantly. He still collected insects in the neighborhood, but all his collections would become spoiled by the humidity and mold.

He finally decided to go searching for help, and wrapping some food in his hammock, armed with his gun, he took the general direction for Baeza (SA-18, 0-78d). After a painstaking trip through swamps and forests, he arrived at an Indian hut. There he knew that his "cargueros" had spread the news of his death, drowned while crossing the *Cosanga*. Osculati hired those Indians to accompany him to the village of Archidona, and left the hut on 15 July 1847. Taking the same way whence he came, he met two other Indians who had been sent by the Governor of Archidona to ask about his fate, since the Governor knew that he had been away from Quito for more than 40 days.

The collections, especially the insects, had been entirely ruined by the rains. After the necessary arrangements, Osculati resumed his trip, accompanied by all the Indians. On 17 July he crossed the *Rio Cosanga*, and, after three days of march arrived at Archidona (SA-18, 1-78b) on the 20th of July. In the last part of the trip he was so weak as a result of the privations endured in the last weeks, that he had to be carried by the Indians.

In Archidona he remained for an entire week, in order to regain his health. On 28 July, transported in a kind of palanquin, carried by six Indians, he started again his voyage to the *Rio Napo*. Following the *Rio Misahualli* (SA-18, 1-78b) he met a multitude of Indians, which constituted the party of the Governor

of Quixos, Don Clemente Guerrero, who was going to Archidona to receive news of him. Joining the party, Osculati arrived at the margins of the *Napo*, in the village of Quixos (? Puerto Napo, NB-18, 1-78d).

In Quixos he remained at the house of Dr. Villavicencio, and in his company went collecting birds and insects. He remained there for 3 months because of the rains and the melting of the snow of the volcanoes Antisana and Cotopaxi, which increased the volume of the *Napo*. While in Quixos, he received news of the capture and punishment of the "cargueros" which had abandoned him, and the President of the Republic, Don Vicente Ramón Rosa, offered to replace everything stolen by the Indians. Also in Quixos two large pirogues were built for the descent of the *Napo*.

On 26 October 1847 Osculati left Quixos, and started the navigation of the *Napo*. Passing the mouth of the *Río Misahualli* (SB-18, 1-78d), he reached Ahuana (SB-18, 1-78d), where he remained some days for a reception offered by the Governor, Don Clemente Guerrero. He made a profit of those days studying the habits of the Indians.

Leaving Ahuana on 1 November 1847, he passed in the same day by Napota and landed in Santa Rosa (SB-18, 1-77a) to collect insects. On the 12th he left Santa Rosa and arrived the next day in Suno. On 14 November he passed the mouth of the *Río Payamino* and landed in La Coca (SB-18, 0-77c). Proceeding down the *Napo* he passed by Jivino (15 November), the mouth of the *Río Indillama* (SB-18, 0-77c; 15 November), Huama (17 November), Sinchicicta (18 November), the mouth of the rivers *Tiputini* (SB-18, 1-76b; 18 November), *Aguárico* (SB-18, 1-75a; 20 November), *Curaray* (SB-18, 2-74c; 25 November), and *Mazán* (SB-18, 3-73c; 27 November), Corococha, and Orán (SB-18, 3-73d; 30 November 1847).

From Orán he proceeded to Pebas (SA-19, 3-72d) in Peru, where he arrived on 1 December 1847 and learned that Castelnau and Durville had remained there for 40 days before descending the *Amazonas*. Castelnau had been waiting for the arrival of Osery, but the latter had been killed in Pongo de Manseriche. As Osery did not appear, Castelnau continued the voyage, and returned to Europe (see Vol. I, pp. 155-157). It was Osculati who transmitted to Castelnau in Paris the letter relating Osery's death.

Osculati left Pebas on 3 December, and went on down the *Amazonas*, passing by Loreto (SA-19, 4-71c; 5 December) and

entering Brazil at Tabatinga (SA-19, 70-4d) on 10 December. Passing afterwards by São Paulo de Olivença (SA-19, 69-4b; 19 December), Fonte Boa (SA-19, 66-3a; 27 December), Ega (now Tefé; SA-20, 65-3d) he reached Manaus (SA-20, 60-3c) on 3 February, remaining there until the 9th of March, with the objective of increasing his collections of insects. Leaving Manaus, and navigating the Amazonas downstream, passing Vila Nova (now Parintins, SA-21, 57-3b), Óbidos (SA-21, 55-2a; 15 March), Santarém (SA-21, 55-2d; 16 March), Monte Alegre (SA-21, 54-2a; 21 March), and Almeirim (SA-22, 53-2b), he arrived in Belém on 30 March 1848, remaining there until 19 June, when he returned to Italy.

The 31 species of Diptera reported by Osculati, of which 17 were described as new, were studied by Rondani, who published the results in the *Nuovi Annali delle Scienze Naturali*, in Bologna, in 1850.

In that same year of 1850, Rondani published another paper describing exotic Diptera, principally from Venezuela, and from the Island of São Sebastião, in Brazil (State of São Paulo). I do not know who collected the specimens in Venezuela. Those from São Sebastião were reported by Casaretto.

GIOVANNI CASARETTO was born in Genova in 1812; his first studies were made at the Collegio dei Scolopi, and afterwards he went to study medicine in the University of Genova, but never practised it, being entirely dedicated to the study of botany. He lived for some years in London and Paris. In 1838 he participated in the cruise of the ship "Regina", under the command of Eugenio Emmanuele di Savoia-Villefranche, Prince of Carignano. He seems to have left the ship near Cape Horn, and to have returned to Brazil, making collections along the principal ports of the coast, from 1839-1840. According to Urban (1906) he visited Recife, in Pernambuco; Salvador, in the State of Bahia (also the Island of Itaparica, near that city); Rio de Janeiro (exploring several of the districts, such as Corcovado, Gávea, Tijuca, L. Rodrigo de Freitas, Morro da Babilônia, etc.); Niterói (Praia de Jurujuba), in the State of Rio de Janeiro; and also visited the Serra dos Órgãos. From Rio de Janeiro he came to São Paulo, visiting the Island of São Sebastião. Proceeding to the south, he visited Florianópolis (Santa Catarina), and Montevideo, in Uruguay.

In 1854, 26 March, Carlo III was murdered, and his consort, Luigia Maria di Bourbon-Artois assumed the government of Parma. The University experienced then a notable progress, and Rondani was invited to assume the professorship of agronomy, also being named director of an agronomic institution. In 1860, with the unification of Italy, and the definite defeat of the Austrians, Rondani went to teach natural history in the Liceo di Parma, as the agronomic institution had been closed. When it was reopened in 1865, Rondani was again appointed to it as director. In 1863 he published one more paper on exotic Diptera, including mostly specimens sent to him by R. A. Philippi. Also included were some other specimens caught by Ghiliani in Belém and some materials given to him by the Marquis Maximiliano Spinola. It is not known who collected the specimens coming from Venezuela. Those from Colombia and Puerto Rico were probably collected by Bertero, but there is no direct evidence for this.

CARLO GIUSEPPE BERTERO was born in the Piedmontese province of Alba, in Santa Vittoria, in 1789. His first studies were made in Alba, and then he studied medicine and natural history in Turin. In 1811 he was made "Dr. med.". In the following years he dedicated himself to botany, and collected in the Piemonte. He went to Paris in 1816 and became surgeon of a ship, going to Guadeloupe (end of 1816-1818), St. Thomas (1818), Puerto Rico (1818-1819), Santo Domingo (República Dominicana; 1819-1820), and Haiti (Jacmel, Les Cayes, Port-au-Prince, etc.). From 1820-1821 he collected in Nueva Granada (Colombia), exploring the lower *Rio Magdalena* (Santa Marta and Barranquilla), when a revolution broke out in 1821 and he had to return to Europe, via Jamaica. After some time spent in Italy, and after his mother's death, on the suggestion of De Candolle he departed in 1827 for Chile, where he lived some time practising medicine. He visited Valparaiso and Santiago, going south to Rancagua and north to Aconcagua, spending some time in Quillota, and, during the Chilean war in 1830, visited the Juan Fernández in company of A. Caldcleugh for 3 months. On 28 September 1830 he went with the general consul of the Society Islands, J. A. Moerenhout, to Tahiti, and there made interesting collections. On 9 April 1831, when leaving the Islands on a return voyage to Valparaiso, he died in a shipwreck (Urban, 1903: 21; Vignolo-Lutati, 1955).

Rondani's last paper in Neotropical Diptera was published in 1868 and contained the description of the collections brought from South America by P. Strobel.

PELEGRINO STROBEL was an Italian naturalist born in Milan on 22 August 1828, and died at Vignale di Traversetolo Parmense on 9 July 1895. With Tastaldi, Pigorini, and Chierici, he was one of the founders of Italian paleoethnology. Called in 1859 to the Ateneo Parmense to teach natural sciences, he began with Pigorini to study the prehistory of the region.

From 1865 to 1867 he taught natural sciences in Buenos Aires. Coming from Italy to Buenos Aires, he stopped first in Rio de Janeiro, where he made some collections. From Buenos Aires he travelled to *Bahía Blanca*, in the south, and entering the Argentinian territory, he went through the provinces of Santa Fé, Córdoba, San Luis and Mendoza, to San Carlos (SI-19, 34-69a). He seems to have taken the route to Santiago (see travels of La Touanne, Vol. I, p. 132) (Enc.).

In 1870 Rondani collaborated in the foundation of the Italian Entomological Society, of which he was the vice-president. He died on 17 September 1879. A list of his publications is given by Osten Sacken (1885). His biography was published by Lessona (1884).

His collections were distributed as follows: the material studied by him in 1848 (in Truqui) and 1850a (from Venezuela and Ilha de São Sebastião), in the Museo ed Istituto di Zoologia Sistemática della Università di Torino (mostly lost); the specimens collected by Osculati on the *Rio Napo*, described by Rondani in 1850b, according to Bezzi, should be in the Museo Civico di Milano (I found not a trace of them during my visit there in 1971); as to the specimens collected by Strobel, their fate is not known (Bezzi, 1908a, 1908b).

### Luigi Bellardi

Luigi Bellardi was born in Genova on 18 May 1818. To please his family, he studied law, but as he always had been attracted to the study of natural sciences, he soon began studies

of fossil molluscs. With his friend Michelotti he collected fossil shells in the hills of Turin. At only 20 years of age he published his first paper on fossil molluscs. In order to increase his field of action, he travelled to Egypt, where he made a large collection of nummulitic fossils.

Between 1854 to 1874, however, he became interested in Diptera, publishing several papers on the fauna of the Piemonte, as well as a monograph on Mexican Diptera (1859-61).

For the publication of his "Saggio di Ditterologia Messicana" he had access to several collections:

1. Those gathered by Eugenio Truqui (Sardinian consul in Cyprus, died in Rio de Janeiro as General Consul in April 1860), about whose life and travels I could find nothing more;
2. Approximately 50 species, collected in the neighborhoods of Mexico City, by a certain ETTORE CRAVERI, of whom nothing is known;
3. The duplicates of Mexican species in the Paris Museum, sent to Bellardi by the director of the Museum, Milne-Edwards;
4. The collections of the Reale Museo di Zoologia di Torino, loaned by the director, Filippo di Filippi;
5. Specimens collected by SALLÉ in several parts of Mexico (see Chapter VIII, Vol. 1);
6. Mexican specimens in the Bigot collection, which had been identified by Macquart;
7. Approximately 100 specimens collected by SUMICHRAST and SAUSSURE.

ADRIEN LOUIS JEAN FRANÇOIS SUMICHRAST was born in Yvonne, canton of Vaud, Switzerland, on 15 October 1828. His studies were made in Lausanne, Geneva, and Berne. He soon became interested in the study of natural history, and, as the European fauna was not enough for him, he decided to accompany de Saussure on his trip to Mexico.

HENRI LOUIS FREDERIC DE SAUSSURE was born at Geneva, Switzerland, on 27 November 1829 and died there on 20 February 1905. He received his elementary education at Briquet, and his advanced training at the Institute of Fellenberg. He studied under the entomologist François Jules Pictet de la Rive, who directed his attention to insects. The early part of his entomological career

was spent in the study of the Hymenoptera and the latter part in Orthoptera, his greatest reputation being made with the last named order. After several years' study in Paris, where he received the degree of licentiate of the Faculty of Paris, he began his travels in 1854, going first to the West Indies, then to Mexico, and finally to the United States, where he met Louis Agassiz and other scientists. He returned to Europe in 1856 with valuable collections of insects, myriapods, crustaceans, birds, and other groups. Aside from his interest in entomology, he also studied geography and ethnology. In 1858 he founded the Geographical Society of Geneva and was its president from 1888 to 1889. For many years he was a member of the committee which managed the Natural History Museum at Geneva. Here he amassed the finest collection of Hymenoptera and Orthoptera in the world. In 1892 he was elected a Honorary Fellow of the Entomological Society of London (Essig, 1931).

Sumichrast and Saussure arrived in Veracruz, Mexico, in April 1855, remaining for a few days in that city. Proceeding thence to Córdoba, they passed by Tospán on 16 April (an 'hacienda' not far from Córdoba), where they visited Auguste Sallé, who was exploring Mexico with Boucard.

After the short stay in Córdoba the two naturalists resumed their trip, going to Orizaba, Puebla, Mexico City, Tampico, and other cities in the interior. Sumichrast collected in those several places with Saussure for about one year, and these collections were taken back to Geneva by Saussure, when he left Mexico, due to the troubles of travelling and the political unrest caused by several revolutions.

Sumichrast decided to stay. He married in Cuchitán (Oaxaca) on 30 August 1870, and from this time to his death he was occupied with the scientific exploration of Mexico, visiting the States of Veracruz, Puebla, Mexico, Oaxaca, Tehuantepec, and Chiapas. In the latter state death overtook him, in Tonala, on 26 September 1882 (Boucard, 1884).

Bellardi was also assistant of the mineralogical museum (since 1844), and curator of the paleontological collections of the geological museum of Turin. He taught for thirty years at the girls' college "Regina Margherita" and in the Liceo Reale Gilberti in Turin. He was elected member of several cultural and scientific societies. From 1870 on, he went back to his studies of fossil molluscs, dying in Turin on 17 September 1889 (Enc.; Sacco, 1889; Lessona, 1890).

The 'Saggio' contains 266 species, of which 176 were proposed as new. The collection is deposited in the Istituto e Museo di Zoologia Sistemática, Università di Torino, together with Bellardi's library.

### Ermanno Giglio-Tos

Ermanno Giglio-Tos was born in Turin on 25 August 1865. He started his studies of natural history under the guidance of M. Lessona and L. Camerano, with whom he learned the principles of systematic zoology. Even in later years, when he dedicated himself to studies of vertebrate anatomy, hematology, cytology, mechanics of development, and applied zoology, he never quite abandoned the study of systematics, of which he was particularly fond.

Entering the Museo Zoológico di Torino at the age of twenty, he became interested in the systematics of insects, and began his activities with a number of papers on Diptera, of which there was an abundant collection, left by Bellardi. His first publications were on European and African flies, but his attention turned afterwards to Mexican and Central American flies. He published short papers from 1890 to 1893, and his great work, the 'Ditteri del Messico', was published from 1892 to 1895, in 4 parts. As Bellardi had not finished his studies of Mexican Diptera, Giglio-Tos completed the work, describing the remaining collections of Mexican Stratiomyidae, Aschiza, Calyptratae, and Acalyptratae.

In 1896 he published his last paper on Neotropical Diptera, describing a striking new genus of Tabanidae brought from Panama by Enrico Festa.

ENRICO FESTA was born in the village of Moncalieri, Italy, on 11 August 1868, and died in the same place on 30 September 1939. He graduated in natural history in Turin in 1891. Lessona welcomed him as volunteer assistant at the Istituto di Zoologia, and Camerano, the next director, named him assistant of the Museum on 1 October 1899; this post was occupied by Festa until his retirement on 1 October 1923. After that, as a reward for his scientific activities and his numerous donations of collections for the Museum, he was made honorary vice-director.

As soon as Festa graduated in 1891 he left for Tunisia on a collecting trip, and on March 1893 travelled again, this time to Egypt, Palestine, and Syria.

On 18 May 1895 he landed at La Guayra (Venezuela), going thence to Colón, Panama, where he learned that a revolution in Ecuador would prevent his coming to that republic. He went then by train to Panama City, and started the exploration of Darien, following many rivers, and collecting in the forests. On September he was able to go to Guayaquil, Ecuador, exploring the country until the end of 1897, having travelled through vast territories in the interior: Cuenca, Gualaquiza, Quito, and Tulcán. In January 1898 he was at Ballenita, in the *Santa Helena Bay*, where he collected many marine animals and examined the thermal waters of San Vicente. Returning again to Guayaquil he visited several coastal regions (Manta, Esmeraldas, etc.), and then went back to Panama. At the end of March he was back in Genova with a large collection: 450 mammals, 3100 birds, over 170 reptiles and amphibians, 150 fishes, and thousands of invertebrates. He also brought a collection of skulls found in a cemetery of Indians at El Troje, in Ecuador.

His collections, mostly unstudied, are in the Istituto e Museo di Zoologia Sistematica della Università di Torino. Festa's book of travels in Panama and Ecuador was published in 1909.

In the following years Festa undertook a series of travels both in Italy and abroad, building large collections which were always donated to the Turin Museum. He was made a member of several learned societies (Arcangeli, 1940).

As the Museum of Turin was receiving a great number of insects, Giglio-Tos became gradually interested in the study of other orders of insects, and after some essays in Coleoptera and Hemiptera, became definitely interested in Orthoptera, in which he was to become known as a specialist.

Appointed professor of zoology and comparative anatomy at the Reale Università di Cagliari, when he was 36 years old, he founded the Istituto di Biologia Marina in San Bartolomeo. He was next called to be professor of zoology and vertebrate anatomy at the University of Firenze, where he remained only two years, passing on to the chair of anatomy and physiology of the University of Turin, where he occupied the chair of zoology, returning then to Cagliari, where he stayed for seven years. His last position was that of professor of zoology in Turin, to which he was appointed in December 1925. He died there on 18 August 1926 (Zavatari, 1927).

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*Chapter XIX*

## Weyenbergh and Wulp

### H. Weyenbergh

HENDRIK WEYENBERGH was born in Haarlem, Holland, on 6 December 1842. Very early he became interested in the natural sciences, and his first entomological observations were published when he was only an adolescent. He studied medicine, graduating when 21 years old, and specialized in surgery and obstetrics. However, the exercise of medicine was not his ideal, and he again entered the Universities of Utrecht and Göttingen, to study natural history. His thesis for the obtention of the doctor's degree was defended in 1871, on the histology and anatomy of dipterous larvae. While in Göttingen he met Hermann Burmeister, then the director of the Museum of Natural History of Buenos Aires, who was looking for scientists willing to go to Argentina, to form a new Academy of Sciences in the city of Córdoba. Weyenbergh immediately perceived that an excellent opportunity was available to dedicate himself to natural history studies in a very rich and interesting region.

On September 1872, aged 30, and recently married to Sjoukje Gorter, he landed in Buenos Aires, and proceeded to Córdoba. There he met the other scientists employed by the Argentinian Government to found the Academy of Córdoba: Lorentz, Siewer, Stelzner, Sellack and Vogler.

Weyenbergh would stay in Córdoba for 12 years. Those were years full of work, of collecting trips, of great realizations (the foundation of the Museo Zoológico de la Universidad de San Carlos, of which he was the first director; the foundation of the Sociedad Entomológica Argentina, and of its journal, the "Periódico Zoológico"; the foundation of the Faculty of Medicine of Córdoba, of which he was Dean and professor of Comparative Anatomy and Histology), and many disputes, especially with Hermann Burmeister, very well known by his difficult character. Weyenbergh wrote several textbooks for the different courses in the Faculties, was the President of the Academia Nacional de Ciencias de Córdoba, when it became separated from the University, and was later "Inspector General de Zoología Agrícola" of Argentina, in addition to minor positions occupied during several years.

From 1873 to 1881 he published a series of papers on Diptera. In 1880 he published the complete list of his papers.

In 1881, when 39 years old, he knew his life wouldn't last for long, as he was badly sick with cancer.

He returned to his native country, and with his wife went to live in a small cottage at Bloemendaal, near Haarlem; neither the medical cares nor the pure air near the sand dunes on the coast could help him. He died on 5 July 1885, aged 42. In the next year a posthumous paper on Diptera was published (Deutier & Steullet, 1928; Hasselt, 1887; Willink, 1972; Wulp, 1885).

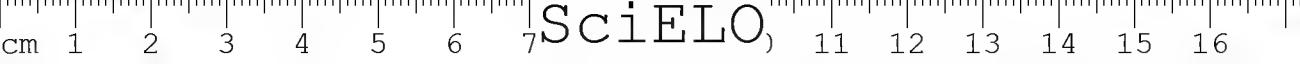
#### F. M. van der Wulp

Frederik Maurits van der Wulp was born in The Hague, on 13 December 1818 and died in the same city on 27 November 1899. His entire career was spent at the Dutch Audit Office, where he entered on 1 September 1843, passing successively to second clerk (1 June 1846), head clerk (1 January 1848), assistant officer (1 April 1854), officer (1 July 1869), head officer (1 January 1879), referendary (head of a special branch at the Audit Office) (1 January 1880), and retired on 1 April 1893. He was nominated Knight of the Order of Orange-Nassau. On 26 May 1848 he married Jeanne Louise Cornelia Brederhuysen, by whom he had four children (3 sons and one daughter).

On 12 October 1845 Wulp was one of the founders of the Nederlandse Entomologische Vereniging (Dutch Entomological Society). From June 1870 to June 1894 he was secretary of the



Inside a forest in Maníçaribá, Rio d. Janciro (Guanabara) (Rugendas)



Scielo

same Society and from July 1867 to June 1894 the editor of its journal, the *Tijdschrift voor Entomologie*, founded in 1858. In 1894 he was elected Honorary Member of the Society.

His wife died on 11 August 1895. From the death of his wife to his death on 27 November 1899 he went to live with his only daughter (Snellen, 1900).

From 1870 to 1892 he published many papers on Neotropical Diptera, based especially on the collections found in Amsterdam and Leiden. Most of his specimens were sent from Argentina by Weyenbergh. He cooperated in the *Biologia Centrali Americana* with the Muscoidea and Pupipara portions (1891b, 1895-1900, 1903). Most of his types are in the Zoölogisch Museum, Amsterdam (including many syntypes of the Muscoidea described in the *Biologia Centrali Americana*, a list of which will be published in the third volume of this work), and some at the Rijksmuseum van Natuurlijke Historie, Leiden. The greatest part of the syntypes described in the *Biologia Centrali Americana* went to the British Museum (Natural History), London.

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*Chapter XX*

## Scandinavian collectors and collections

C. E. Kiellerup

CARL EMIL KIELLERUP was born in Copenhagen in 1822. He studied theology, but had a greater interest in natural history, which he taught in several schools in Copenhagen. At that time (in the early 1840's) he was an eager collector and a fellow of the Scandinavian Entomological Society.

Commissioned by King Christian VIII he participated as entomologist in the "Galathea" expedition around the world in 1845-47 and returned home with a large material for the Royal Museum of Natural History. He then became a teacher of natural history again, first in Copenhagen, later at Flensburg. In 1864, after war, he was expelled from South Jutland by the German administration, and in 1869-97 was a teacher at the Soroe Academy. He died in 1908 (Henriksen, 1925: 183).

Kiellerup took care of the insects, during the circumnavigation of the "Galathea", of which he sent home some 6 large cases. The "Galathea" visited several countries in the East, and from Tahiti and Bora-Bora came to the South American Pacific coast, touching at Valparaiso (Chile), Cobija (then a Bolivian port), the Chincha Islands and Callao in Peru, and then, through Cape Horn, visited Buenos Aires, Montevideo, Rio de Janeiro and Salvador (Bahia). From Salvador the expedition returned to Denmark.

### H. Kroeyer

HENRIK KROEYER was born in Copenhagen on 10 March 1799. He first studied medicine, then classic philology, and founded with the poet Christian Winther the "Studentforeningen", a students' association still in existence in our days.

When the Greek insurrectional war started in 1821, Kroeyer, moved by the general Greek friendly enthusiasm, went to Greece. He returned in 1823, strongly disillusioned with the modern Greeks.

After a period as a teacher in Stavanger, Norway, from 1827 to 1830, he returned to Copenhagen and became a teacher of natural history at the Landcadet-Academiet, and at the Metropolitan School. He was then requested by the government of undertaking a number of journeys along the Danish coast in order to study the fishing conditions. About the same time he started the publication of the "Naturhistorisk Tidsskrift", of which, from 1836 to 1849, 6 volumes were published. The journal, as long as it existed, was the organ for all Danish entomological writings. Kroeyer was also co-promoter of the "Naturhistorisk Forening" (1833). Requested by the French Government he participated in the expedition to the North Cape and Spitzbergen on board the corvette "La Recherche", in the quality of ichthyologist and carcinologist. Upon his return in 1839 he obtained the Great Cross of the French Légion d'Honneur, and became a member of the "Videnskabernes Selskab" (Academy of Sciences) in Copenhagen.

In 1840, on board the Danish frigate "Bellona", he voyaged to South America (no further details are given), to collect samples for the Royal Museum, and especially for the private collection of Christian VIII. In 1842 the University of Rostock gave him the title of 'Doctor Honoris Causa', and during that same year he was employed as curator of the reptiles, fishes and crustaceans, in the Royal Natural History Museum in Copenhagen. From 1837 to 1858 he taught zoology at the Veterinary School.

From 1853 to 1854 he collected a large amount of marine animals in the North Atlantic coast, and in the American coast (specially near New Orleans), and many insects were brought to the Museum. From 1864 on, after the internal changes in the Museum, he retained the job of curator of crustaceans and fishes only, and, because of an increasing weakness, he retired from the Museum in 1869, dying on 14 February 1870 (Henriksen, 1926: 204-207, fig. 60).

### F. M. Liebmann

FREDERIK MICHAEL LIEBMANN was born in 1813 at Helsingør, and started his botanical studies in 1832, but did not take examinations. After travels through Germany and Norway he became assistant professor in the Veterinary School in 1837, and at the University in 1838. In 1840 he started on a 3 years' trip to Mexico (visiting from Veracruz to the forests of Orizaba), where he collected a large material of plants and some animals. After his return to Denmark he became assistant professor of botany in the University (1845), and director of the Botanical Gardens. In 1844 he was made a fellow of the Academy of Sciences. He died from tuberculosis, in 1856 (Henriksen, 1926: 208).

### F. V. A. Meinert

FREDERIK VILHELM AUGUST MEINERT was born in Copenhagen on 3 March 1833. Following his father's wishes he studied theology and graduated in 1857. However, he had a greater interestet in entomology, and already as a student he established relation with Schiödte and started working at the Museum's entomological department, with hand work at the beginning, and later with a more scientific work, among other things collecting coleopterous larvae.

In 1891 and 1892 he participated in a collecting trip to the West Indies and Venezuela, and brough back, especially from the latter country (Las Trincheras and La Moca) a valuable arthropod collection of over 700 species, including many reared beetles. An account of his trip was published in 1892. He died in 1812 (Henriksen, 1927: 253-262, fig. 71).

### A. S. Oersted

ANDERS SANDOE OERSTED was born in 1816 in Rudkoebing. In 1835 he went to the Borgerdydskolen to study natural history, and later to the Metropolitanskole. His M. A. degree was obtained in 1844. From 1845 to 1848 he travelled through the West Indies and Central America, having collected more than 200 species of Arthropoda in Costa Rica and Nicaragua, which vere

sent to the Royal Museum in Copenhagen. From 1850 on, he became definitely interested in botany, becoming "Docent" in 1858, "titul. Professor" in 1860, and "Professor ordin." of the University of Copenhagen in 1862. He was made a member of the Academy of Sciences in 1865. He died in 1872 (Henriksen, 1926: 208-209).

### J. T. Reinhardt

JOHANNES THEODOR REINHARDT, son of the zoologist J. H. Reinhardt, was born in 1816. He first studied medicine, the zoology. As a zoologist he participated in the "Galathea" expedition, from 1845-47, and on the way home he left the ship in Rio de Janeiro to follow to Lagoa Santa (Minas Gerais, Brazil), to visit P. W. Lund (see Vol. I, pp. 89-91). In Brazil he collected over 2700 specimens of insects (representing 967 species), of which 213 were new for the Museum. Upon his return to Denmark he became inspector of the Royal Museum of Natural History in Copenhagen, being charged of the higher vertebrates. From 1856 to 1878 he was lecturer of zoology at the Polytechnical School and in 1861 at the University.

In the years 1850-52 and 1854-56 a grant allowed him to travel again to Brazil, to collect natural history specimens. He brought back a very rich material, especially from the States of Minas Gerais and Rio de Janeiro.

In 1854 he became full professor, and in 1856 member of the Academy of Sciences. He died in 1882 (Henrikse, 1926: 213-214, fig. 64).

### R. F. Sahlberg

R. F. SAHLBERG, professor at the University of Helsinki, undertook at his own expenses a trip to Brazil. Leaving Abo on 17 September 1849, he arrived in Rio de Janeiro on 21 November. He stayed for about two months in the city, collecting in the neighborhood, and preparing himself to proceed to the interior. He went next to Petrópolis, with the intention of remaining there for a short time; however, the epidemics of yellow fever which appeared at the occasion, not only in Rio, but in other parts of the country, caused him to change his plans, and he had to remain in Petrópolis for about 5 months, since that region was healthier because of the altitude.

He was then offered the opportunity to accompany the Russian Minister in Rio, Count Medem, in a trip to the interior of the Provinces of Rio de Janeiro and Minas Gerais, some 250 to 300 leagues to the interior. Nothing is known about the itinerary. He visited the golden mines exploited by the English in Minas Gerais, and returned to Petrópolis. He afterwards explored the nearby districts of Cantagalo for three months. After one month more in Petrópolis, and in Rio, he embarked to Finland on 23 January 1851.

He collected during his stay in Brazil some 30 skins and skeletons of mammals, 300 or 400 skins and skeletons of birds, and from 60,000 to 70,000 specimens of insects, in all Orders (Reiche, 1851).

Sahlberg must have collected in Minas Gerais from Chapéu d'Uvas to Diamantino (the ancient Tejuco) (see itinerary of Saint Hilaire, Vol. I, pp. 116-118). Martins (1967: 126) had specimens collected by Sahlberg in Santa Rita, on August 1850, which points out to the itinerary cited above.

#### W. Soerensen

WILHELM SOERENSEN was born on 9 April 1848 in Hyllested, near Grenaa, where his father was a minister. He studied zoology and graduated in 1873. From 1874 to his death in 1916 he was a teacher in different schools in Copenhagen. As zoologist he was a disciple of Schiödte, and became a specialist in Arachnida. After the obtention of his degree he was invited by a private person to join in on a long voyage; however, he left the ship in South America, and spent 2 years (1876-78) near the Gran Chaco in northern Argentina, studying and collecting animals. He brought back to the Zoological Museum a large and rich material of different arthropods, especially Opilionida and termites, most of them from *Riacho del Oro* (where it joins the *Rio Paraguay*), where he lived with the Swedish engineers W. Christereson and Strunck. Soerensen published a report about his journeys (1883).

His Ph. D. degree was obtained with a thesis "On lydorga-  
ner hos Fiske". In 1884 he also published a paper with new  
descriptions and biological notes on some termites (Henriksen,  
1937: 489-494, fig. 148).

### The Westermann collection

Bernt Wilhelm Westermann was born in the neighborhoods of Reingkoebing, Denmark, on 11 November 1781, from a very poor family. He began to work at the firm Hemmert, at that a well-known firm in Copenhagen. Since his boyhood he liked to collect insects and wished to travel to a tropical region; now he had that chance — he embarked in one of the firm's ships, bound for India, and there, recommended by Hemmert, got a job in an English firm, where later he became a partner. After the firm's bankrupt he travelled as an agent to Batavia, in Java, where he had a much better luck, and acquired a considerable fortune.

He collected eagerly in Bengala and Java, and had his English and Dutch business friends Schnebbelei and Horsfield collecting for him in their own commercial territories.

Eventually Westermann left Batavia and travelled home, after having spent some time near the Cape of Good Hope, where he also obtained a rich entomological yield. He came to Copenhagen in 1817, and got in touch with Wiedemann in Kiel and gave him his rich collection for identification. A lot of types of new species of flies and beetles described by Wiedemann are to be found in Westermann's collections.

At Wiedemann's request Westermann wrote down his observations on the biology of the East Indies and Cape insects, in the form of letters to Wiedemann, with the title "Ueber die Lebensart Ostindischer und Capscher Insekten", and published in Silbermann's *Revue Entomologique* (1833, pp. 103-105).

Westermann's collections became larger and larger. He got materials from Prof. Liebmann from Mexico, Högberg (from Veracruz, Mexico), and from P. W. Lund, from Brazil.

One can say without exaggeration that he was in contact with every one who had a fair insect collection, and in this way he could complete his own collection, so that it became the largest private collection of that time. In 1868 Schiödte said: "The beetle collection is about 1/3 bigger than the Museum's collection, not to talk about butterflies, the Museum collection being quite insignificant compared with Westermann's".

His collections at that time comprehended about 45,000 species, of which 31,000 beetles and 5,000 Lepidoptera; the last figure may sound small, but Westermann only wanted perfect specimens. Westermann attached much importance to the beauty

of his insects, and for this reason his collections contained especially large and attractive insects, becoming in this way a really magnificent collection, which was at his death estimated at 16,000 rigsdaler.

Upon his return to Denmark in 1817, Westermann felt that he was too young and energetic to settle down and enjoy his money and collections, and started a considerable activity as a businessman. He became wholesale dealer, shipowner, and the proprietary of the sugar-refinery "Phoenix" in Copenhagen. At the same time he worked for a long time (until 1838, when he became too much occupied with his own business activities) at the Royal Natural History Museum in Copenhagen, with the Sehestedt-Lund collections, and as a compensation he obtained permission to take duplicates for his own collection.

Westermann died on 10 March 1868. After his death the Museum got the complete collection (including the beautiful cabinets and exhibition cases) with the only clause that the collection should be kept separate and isolated from the rest of the Museum's collections, and that there should be appointed a special curator (Loevendal, who had helped Westermann during the last years). These clauses were however cancelled at the beginning of 1900 by means of an agreement with Westermann's family (Henriksen, 1923: 161-164, figs. 39-40).

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## *Chapter XXI*

### Fritz Müller and Emil Goeldi

#### J. F. T. Müller

JOHANN FRIEDRICH THEODOR MÜLLER was born in the village of Windischholzhausen, near Erfurt (Thüringen), Germany, on 31 March 1822. His father, a protestant minister, had a very hard life, as he had to maintain his numerous children — Charlotte (1823), August (1825), Rosine (1827), Hermann (1829), Luise (1832), and Ludwig Theodor (1835). August would come to Brazil with Fritz Müller and be his inseparable companion. Hermann, also a naturalist, died in 1833, as "Oberlehrer" in Lippstadt.

Fritz Müller's mother was daughter of Johann Bartholomaeus Trommsdorff, a noted chemist, and had a great influence on Fritz's tastes for the study of Nature.

In 1828 the family moved to Mühlberg, in Thüringen. In the Lent of 1835, 13 years old, Fritz left his parents' home and moved to the home of Trommsdorf, in Erfurt, where he frequented the city's gymnasium, and worked at the "Schwannapotheke". From those times he kept very bad remembrances. In 1840 he moved to Naumburg, where his uncle Wilhelm Möller lived. There he worked at Herr Bennecken's pharmacy. His adventurous ideas of travels to distant countries, which he had at that time, had no chance to become reality, and he decided to be a teacher. With

this objective, he entered the University of Berlin in 1841, where he studied mathematics and natural history. He had as professors great names like Lichtenstein (zoology), Kunth (botany), Johannes Müller (anatomy). Johannes Müller, in a special way, was his best friend and appreciated very much his talent for drawing. On 14 December 1844 Fritz obtained his doctor's degree, with the thesis "Ueber die Blutegel der Umgebung Berlins".

In 1845 he returned to Erfurt as a teacher in the city's gymnasium, where he taught algebra and natural history. From 1849 to 1852 he was employed as preceptor of the children of a distinguished agriculturer of Roslophagen, near Grimmen, New Pommerania, Herr Lamprecht. In 1848 he married the woman who would accompany him during all his existence, Karoline Töllner, and had a daughter in 1849. Mrs. Müller died in 1899, aged 68.

Since his boyhood in Erfurt Fritz Müller had known Dr. Hermann Blumenau, botanist and pharmacist, who had founded, in 1850, a German colony near the *Rio Itajai*, in the State of Santa Catarina, southern Brazil. Fritz Müller, who always had the idea of travelling, decided in 1852, after the birth of his second daughter, Anna, to embark with his brother August to Brazil.

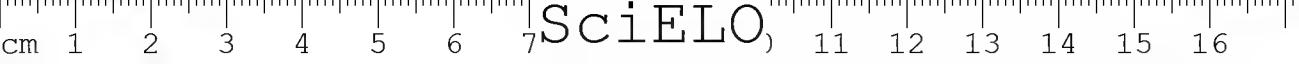
They left Hamburg on 17 May 1852, aboard the 'Florentin', headed for São Francisco, Santa Catarina. The ship arrived on 17 July. On 21 August 1852 the two travellers reached the margin of the *Arroio das Velhas*, in the *Itajai* Valley, being receptioned by the founder of the colony, Dr. Hermann Blumenau (now the city bears his name, Blumenau). The two brothers became established at the margins of the *Arroio Garcia*, one hour distance from the mouth of the *Rio Itajai*.

In the middle of the virgin forests that covered the region, working hard with an axe and a plow, Fritz Müller enjoyed the life in the colony, in spite of the hard conditions. Only thrice a year (Lent, Pentecostes and Christmas), a cow was killed; illumination was provided by candles made of fish oil, or with branches of a resinous tree, the "arariba", discovered by Fritz Müller. Dr. Blumenau had a great appreciation for the work and energy of the two brothers.

In 1857 Fritz Müller assumed the position of teacher in the gymnasium of Desterro (now Florianópolis), where he remained until 1864, being dismissed from that post by narrow political reasons. He returned to Blumenau, assuming a modest position



Typical way of travelling in the 19th century (Prince Wied-Neuwied)



of public officer, from 1867 to 1876, during this time undertaking a series of observations that attracted the attention of the European naturalists. The National Museum of Rio de Janeiro named him in October 1876 travelling naturalist, a position which he held until 1891.

On 14 December 1894, in honor of his doctoral degree by the University of Berlin, he received a warm message with the University's congregation effusive compliments.

On 7 September 1863 Fritz Müller published his "Für Darwin", a booklet printed in Florianópolis, that would bring strong support to the ideas on evolution of Darwin, then under great discussion, and much attacked both by zoologists and theologians. Darwin called Fritz Müller "Prince of the researchers".

His studies on insect coloration, published in 1879, became famous and are now an important chapter in the theory of mimicry, known as Müllerian mimicry. As pointed out by Brower et al. (1963: 66): "Wallace (1871) was also puzzled by the resemblances among related butterflies and suggested that the 'distasteful secretion is not produced alike by all members of the family, and that where it is deficient, protective imitation comes into play' (p. 85). This statement was of the utmost importance because it initiated the idea of varying degrees of unpalatability within a group and in addition anticipated the line of reasoning later developed by Müller (1879). He, too, had had experience in the Neotropics, and from his observations on two butterflies, *Thyridia* and *Ituna*, arrived at a new hypothesis. Because of their similar appearance, these two genera had until that time been lumped in the family Danaidae. On several morphological bases; Müller separated them, leaving *Ituna* with the Danaidae but placing *Thyridia* with the Ithomiidae. He then realized that these two butterflies which superficially resembled each other both belonged to supposedly distasteful families. In addition species in the one genus sometimes outnumbered those in the other and vice versa in the natural environment. These facts did not meet the conditions of mimicry in the Batesian sense where one member of a similar pair is palatable and rare. Müller reasoned that if each predator has to learn the distinction between unpalatable and palatable species, then a certain number of individuals of both must fall victim to the inexperience of young enemies. But if two unpalatable species are sufficiently alike to be confused by predators, a lesson learned on one will also benefit the other. Thus the two will tend to converge upon a common color-pattern through

selection by their insectivorous enemies, resulting in Müllerian mimicry."

All these contributions by Müller were made in Blumenau, during the scarce time that the naturalist had, among his agricultural works.

Fritz Müller's papers on Diptera are most interesting. He was the first to discover the larvae of Blephariceridae, and, after sending a note on his discovery to the Royal Entomological Society of London (1879) he described the larvae, pupae and adults of the Blephariceridae (*Paltostoma torrentium*), in a most enviable detail (1880, 1881a, 1881b). He also discovered the very strange larvae of the genus *Maruina* (Psychodidae) (1895).

An excellent biography of Fritz Müller, together with his papers and correspondence, was published by Alfred Möller in two volumes (1915) (Roquette Pinto, 1929).

#### Emil Goeldi

Emil August Goeldi was born on 28 August 1859 in Ennetbühl im Obertoggenburg, Switzerland. His studies were made first at the Realschule in Heiden, and later at the gymnasium of Schaffhausen. Later on, he spent some time in the French cantons of Switzerland. In 1882 he entered the University of Jena, learning zoology and anatomy under Haeckel and Hertwig. After his obtention of the doctor's degree, he was offered three opportunities: to be professor in Chile, curator of the Adelaide Museum in Australia, or be Professor in Rio de Janeiro, Brazil. He chose the latter, and went to Rio, where he worked in the National Museum, being much protected by the Emperor, Dom Pedro II. With the proclamation of the Republic in Brazil, in 1889, he and many of his colleagues lost his job. Goeldi went to live up the mountains (Serra dos Órgãos), in the "Colonia Alpina". Later on, he was offered by the new government the unique opportunity of founding a new Museum, at the mouth of the Amazons River. Goeldi departed in 1894 from Rio to Belém, and in a few years built a very large institution, and maintained two journals, the Bulletin, and the Memoirs. The museum would be called after him even in his lifetime. He was the director until his death, on 5 July 1917 (Studer, 1917).

He published a paper on mosquitoes (1902), and other on the mosquitoes of Pará (1904). Those papers were republished in 1905.

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*Chapter XXII*

## Herbert Huntingdon Smith

HERBERT HUNTINGDON SMITH, one of the greatest collectors of Diptera, was born in Manlius, New York, on 21 January 1851. He studied at Cornell University from 1868 to 1872. In 1870, while still a student, he came for the first time to Brazil, in the Morgan Expedition. The objective of the expedition was to secure "a large quantity of specimens of all departments of nature" (Hartt, 1874), but was mainly geological. the director of the expedition, which was financed by a certain Mr. Morgan of Aurora, New York (thence the name of the expedition), was Prof. Charles Frederick Hartt, geologist, well-known by his publications on Brazilian geology; as associates came Prof. A. N. Prentiss, botanist; several students also came to receive a background in natural history: W. S. Barnard, C. J. Powers, P. P. Stanton, P. M. Johnson, and D. B. Wilmot. Two other students, H. H. Smith and Orville A. Derby were to become famous, one in entomology, and the other in Brazilian geology. T. B. Comstock came to study geology, and to be the expedition's photographer. H. Kendall was the director's secretary.

Most of the insects collected during that expedition were gathered by H. H. Smith, especially in Belém ("Pará" or "Grão Pará"; SA-22, 49-1d), Nazaré (a district of Belém), Vigia (SA-22, 48-1a), Itaituba (on the Rio Tapajós; SB-21, 56-4c, Rio Tocantins, and Santarém (SA-21, 55-2d).

In 1874 Smith returned to Brazil in order to collect and study the Amazonian fauna. He spent 2 years in the neighborhood of Santarém (SA-21, 55-2d), and later spent one year exploring the northern tributaries of the *Amazonas*, as well as the *Rio Tapajós* (SA-21, 55-3a; SB-21, 57-5d). Afterwards he stayed four months in Rio de Janeiro.

Back to the United States, he was commisioned by Scribner's Magazine to write a series of articles about Brazil. For this purpose he undertook two more travels to that country, studying the industries, the political and social conditions, and investigating the problem of the periodical droughts of Ceará. In one of those trips he was accompanied by J. Wells Champney, employed to illustrate his articles. One of the results of those trips was the publication of "Brazil, the Amazons and the Coast" (1879).

On 5 October 1880 Smith married Miss Amelia Woolwirth, from Brooklyn, New York, who was also interested in natural history and had a great skill in the preparation of specimens; she became an excellent taxidermist and a good preparator of insects.

Smith came with his wife again to Brazil, staying from 1881 to 1886. In May 1881 they spent some months in Belém (Pará), 10 days in the state of Pernambuco, and 6 months in Rio de Janeiro, where they were encouraged in their collecting efforts by the Emperor, D. Pedro II. From Rio, by ship, they visited the ports of Santos in São Paulo (SF-23, 46-24a), Paranaguá in Paraná (SG-22, 48-26a), Florianópolis in Santa Catarina (SG-22, 48-28a), and then São José do Norte and Rio Grande in Rio Grande do Sul (SI-22, 52-32c). Proceeding overland via Pelotas (SH-22, 52-32a), Porto Alegre (SH-22, 51-30c), Viamão (SH-22, 51-30d), Cai (SH-22, 51-30a), Jacuí (SH-22, 53-30a), São João do Montenegro (now Monte Negro, SH-22, 52-30b), they returned to Porto Alegre, crossed the *Rio São Gonçalo*, and went once more to Pelotas (April 1882). They visited next Cacimbinhas, near Bagé (SH-21, 54-31c), took a ENE direction, going to Piratini (SH-22, 53-31c), Serra das Panelas (?), and again Pelotas and Porto Alegre. From São João do Montenegro, which was again visited, they went to the town of Rio Grande, where they embarked for Montevideo, and then to Buenos Aires.

Ascending the *Rio Paraná* they visited Rosário (SI-20, 33-61b) and Corrientes (SG-21, 27-59d) in Argentina, and, proceeding up the *Rio Paraguay* touched Humaitá (SG-21, 27-59d), Asunción (SG-21, 25-58d), Concepción (SF-21, 23-57c), the *Rio Apa* (SF-21, 22-58d) in Paraguay, reaching Corumbá (SE-21, 57-19a), in Mato Grosso, Brazil. Navigating

the rivers São Lourenço and Cuiabá, they reached the town of Cuiabá (SD-21, 55-15b), and finally Chapada dos Guimarães (SD-21, 56-15d) (see below).

Smith and his wife remained in Chapada from 1822 to 1886, leaving only on 6 September 1886 for the United States. Chapada remained, since that time, one of the most famous type-localities of Brazil.

During his trips Smith wrote a series of articles about his results and observations in the several regions in which he was travelling for one of the Rio newspapers — the "Gazeta de Notícias". These articles were translated into Portuguese by Capistrano de Abreu. The first was published on 21 July 1886 and the last on 20 October 1887. Later on, the articles were united into a small book (*Do Rio de Janeiro a Cuyabá, notas de um naturalista*, 1922).

In one of his letters to P. P. Calvert, Smith described several of the localities where he collected, and as some of them are so small that they do not exist in modern maps, I give here the transcription of Smith's comments (Calvert, 1909):

## I. Brazil

- (i). Cachoeira — "This is a stream, or small river, which rises near Chapada, flows N then NE and finds its way to the R. Cuyabá. The collections with this label were made at a place about fifteen miles NE of Chapada, where the river passes through a gap in the hills. Forest and grass-lands with some boggy places. Practically the same as Chapada."
- (ii). Chapada — "A small village of Matto Grosso, Brazil, about twenty miles ENE of Cuyabá, on the plateau. The village itself is about 2,500 feet above sea level, or 1,800 ft. above Cuyabá; but collections are from all surrounding region as low 1,500 ft. This is a country of mixed forest and campo, or grass-land with scattered trees; there are many streams — some small lakes or ponds, and tracks of more or less boggy savannah where the streams rise. The name Chapada is really a generic appellation, applied to the plateau in general. The real name of this village is Santa Anna La Chapada [sic] and in some maps it appears as

*Santa Anna*; but in all that region it is simply known as *Chapada*, or *the Chapada*."

- (iii). *Cuiabá* — "The Capital of Matto Grosso, on the *R. Cuyabá* (*Cuiabá*), a branch of the Paraguay. There is little flood-plain here; mostly rocky land, but well watered by streams."
- (iv). *Corumbá* — "A town on the *Paraguay*, near the junction of the *Taguary* (*Taquari*), the port of entry for Matto Grosso. There is a tract of dry rocky land, a kind of island, in the flood-plain of the *Paraguay*, which is very extensive. Collections were made principally in the flood-plain; the waters were rising, but I used to wade about with a boy pushing a canoe through the grasses behind me. These flood-plains are mostly open grassland, with some forest along the river and channels."
- (v). *Uacarizal* — "I am not quite sure of this locality. It is a plantation in Matto Grosso either near the *R. Paraguay* or near *Cuyabá*, I think it is on the *Paraguay*, not far from above the junction of the *R. Cuyabá*; at any rate, there is a cattle plantation there, where we worked for some time..."

## II. Bolivia

- (i). *Piedra Blanca* [often quoted in dipterological literature as *Piedra B.*, *Piedra Blanca*, or *P. B.* in labels] — "In Portuguese *Pedra Branca*. A small trading station or custom-house, four miles W of *Corumbá*, and just within the boundary of Bolivia. A road runs from here over the plains to the larger Bolivian towns of the Andes. *Piedra Blanca* is on the edge of the flood-plain of the *R. Paraguay*; there is a lake communicating with the river near *Corumbá*. Practically the collections are same as those of *Corumbá*, and I only kept them separate because they are from within the confines of Bolivia."

The collections obtained during those trips were partially acquired by the Brazilian National Museum, in Rio de Janeiro, where no trace is left of them, and by D. F. Godman (now in the British Museum); also by Holland, who subsequently bought

the greater part of the Lepidoptera, and finally by the Carnegie Museum, which has obtained the greatest portion of all the insects, some 30,000 species, in a total of 200,000 specimens. A few are also in the American Museum of Natural History, New York, being mostly types described by Williston (see Chapter XXIV).

In 1889 Smith worked in Mexico, collecting for D. F. Godman — these insects were to be used for the "Biologia Centrali-Americana" (see Chapter XXV). From 1889-1895 he was employed by the West Indian Commission of the Royal Society, to collect in Trinidad, St. Vincent, as well as in the Windward Islands.

He was later appointed curator of the Carnegie Museum. From 1898 to 1902 he collected in Colombia for the American Museum of Natural History (New York). The collections were made during theree and a half years, from March 1898 to September 1901.

About his travels in Colombia, Smith wrote (Allen, 1904: 408-414):

"My original intention had been to explore the whole Department of Magdalena, that is, northern Colombia from the *Magdalena River* to Venezuela, and extending from the coast over 200 miles inland. Almost in the outset, I was laid up for six months by a severe illness, subsequently my plans were frustrated by a civil war which made travelling practically impossible. Our work was thus restricted to a comparatively small area in the northwestern corner of the Department. A brief description of this region may be useful and I shall preface it with some general remarks on the mountain region to which it belongs."

"The Sierra Nevada de Santa Marta [NC-18, 11-74b] is an isolated mass midway between the *Magdalena* and the Venezuelan frontier, and within sight of the northern coast. It is nearly 18,000 feet high, and has a very extensive snowfield, stretching probably thirty miles from southwest to northeast. The Sierra Nevada does not belong to the Andean system; westward it is separated from one branch by the broad plains of the *Magdalena*, and to the east and southeast a long valley divides it from the Black Andes. This valley is drained by the river *Cesar* [NC-18, 9-74b], flowing south-southwest to the *Magdalena*; and the river *Rancheria*, passing northward to the coast; the sources of these streams are close together, and the pass between them is said to be less than 1000 feet above sea level. A depression of 1000 feet, therefore, wold reduce the Sierra Nevada region to an island, separated from the continent by a narrow channel on the east and south and a broader one on the west. This almost insular

character of the region is important, and should be borne in mind. It may be noted that the geological formations of the Sierra, as far as we have any knowledge of them, show no direct relations with those of the Andes. There are no active volcanoes, and no extinct ones are certainly known. Earthquakes are common in the Andean chain and their vibrations are sometimes felt simultaneously from Peru to the Caribbean Islands, but they do not affect the Sierra Nevada. The occasional slight tremors are purely local."

"North of the Sierra the Caribbean coast extends nearly east and west; but at Cabo de la Aguja [NC-18, 11-74a], near Santa Marta [NC-18, 11-74a], it turns southward at a right angle, twenty miles from the point the high coast touches the plains about the great lagoon called *La Cienega* [*Ciénaga Grande de Santa Marta*; NC-18, 11-74c]; beyond this the mountainous lands adjoin the plain along the north and south line. The plain and lagoon are part of the estuary system of the *Magdalena*."

"Our explorations were made mainly within a triangle formed by the coast and the San Lorenzo Mountains [Cerros San Lorenzo; NC-18, 11-74b]. These mountains form a lower chain, trending from west-southwest to east-northeast, and are separated from the Sierra Nevada by a narrow and deep valley, the Horqueta [*La Horqueta*; NC-18, 11-74b], one of their peaks is 8400 feet high as measured by my aneroid, and I judge that the San Lorenzo Mountains which I did not reach, are at least 500 feet higher. To the northwest of the principal range are several lower ridges, roughly parallel to it and abutting diagonally on the northern coast. This portion of the coast is remarkably picturesque, a succession of rocky headlands with deep bays between the ridges; the bays are often backed by sand beaches and mangrove swamps of no great extent. Further east the headlands are no longer seen, and low, rolling lands extend back to the base of the Sierra Nevada."

"Numerous streams rise in the San Lorenzo Mountains, flowing down through deep ravines in long series of cascades; as they approach the coast they have wide valleys with more or less alluvial land. The most important of these streams are the rivers *Cordova*, *Frio*, *Guaira*, *Manzanares*, *Piedras*, *Buritaca*, and *Don Diego*. The only swamps are those of the *Magdalena* estuary, some small patches along the lower course of the rivers, and the mangrove districts."

"With the exceptions noted below the whole region is covered with forests, but there are two strongly contrasted growths, which I distinguish as mountain forest and dry forest. Locally

these are called mata and pampa, the latter term, in this region, including dry forest as well as grass lands."

"The true mountain forest is a matted growth of trees and vines with numerous epiphytes and ferns; very few trees shed their leaves at stated seasons, and the forest is damp and verdant throughout the year. In the dry forests, on the contrary, nearly all the trees and vines are leafless during the latter part of the dry season, February to May; the few peculiar ferns die down to the roots. Grasses and herbs are abundant wherever the ground is not too shady, but they wither during the dry months. The distinction of plant species is almost complete, and is all the more remarkable because the two kinds of forest exist side by side; during the rainy months an unpractised traveller will hardly note that he is passing from one flora to another, but in March the dry forest is almost leafless, while the other is green and luxuriant."

"The extreme summits of the San Lorenzo Mountains are generally without large trees, the low growth consisting of bromelias, ferns, bushes, etc. But with these exceptions the mountain forest covers everything down to a level of about 2000 feet above the sea; below that it extends in narrow lines along the river shores, sometimes to the coast. Further east, near Don Diego, the mountain forest comes down bodily to the sea-shore or near it."

"The dry forest covers most of the remaining country, sometimes with a heavy growth of high trees, sometimes lower and more open; on dry hills near the coast it becomes 'scrub', seldom over twenty-five feet high, but with little change of plant species. In the river valleys it is generally separated from the water by a thin line of trees like those of the mountain forest. On ridges and hills, especially in Manzanares valley the trees often disappear altogether or grow scattered over the open grass land..."

"Following is a list of the principal localities marked on my labels..."

1. Santa Marta [NC-18, 11-74a]: city in a bay of the same name, north of the *Manzanares river*; the bay is backed by salt plains and surrounded by dry hills covered with a scrubby growth (dry-forest species). Considerable tracts if the lower lands are irrigated.

2. Bonda [NC-18, 11-74a]: village on the river *Manzanares*, 7 miles east of Santa Marta. This was our headquarters during the greater part of our stay in Colombia. The village itself is only 150 feet above sea-level, but most collections were made in somewhat higher land. The country is hilly, covered in great

part with dry forest with intervals of open grass in the ridges. A thin line of mountain forest adjoins the river.

3. Mamatoco [NC-18, 11-74a]: village on the *Manzanares*, 2 miles below Bonda; elevation 100 feet; vegetation as at Bonda, but with more scrubby growth on the hills and some small tracts of swamp. Cantillito is a small plantation between the two villages, adjoining Quebra Mojada, a stream and ravine.

4. El Libano [NC-18, 11-74a]: plantation 1 mile south of Mamatoco; elevation 150 feet. This must not be confounded with the locality of the same name among the mountains.

5. Masinga [NC-18, 11-74a]: valley on the *Manzanares*, 1 mile above Bonda. Elevation 250 feet; vegetation as at Bonda.

6. Masinga Vieja [NC-18, 11-74a]: on the *Manzanares*, about 4 miles above Bonda, at 600 feet; it is the site of an Indian village, now abandoned. The line of mountain forest along the river has here become broader; the neighboring ridges rise to 1000 feet and are generally open and grassy.

7. Onaca [NC-18, 11-74a]: plantation, 18 miles ESE of Santa Marta, at the lower border of the main mountain forest, which here adjoins the open lands. Elevation 2000 feet.

8. Jiracasaca (?): plantation near Onaca, and at about the same level.

9. Las Nubes [NC-18, 11-74b]: plantation 3 miles south of Onaca, at 4500 feet; large clearings in the mountain forest. Alto de Cielo is a locality and clearing near it, at 5000 feet.

10. Don Amo [Donamo; NC-18, 11-74b]: plantation 18 miles east of Santa Marta, in mountain valley, at 1500 feet; large clearings in mountain forests, with adjoining dry forest and open lands. Don Amo Viejo is a locality near it.

11. Cacagualito (?): plantation 20 miles east of Santa Marta, 1500 feet; vegetation principally mountain forest, which extends to a lower level. Jordan is a plantation 2 miles further east, in a valley at 1000 feet.

12. Taganga [NC-18, 11-74a]: fishing village on a bay of the same name. 2 miles northeast of Santa Marta, surrounded by low mountain ridges; the country is very dry, with a scrubby growth (dry-forest species) and numerous cacti. The coast is rocky and high, sometimes with surf-washed caves in which bats are abundant. Guairaca, Clinto, and Neguanje, are uninhabited localities on the coast further east.

13. Buritaca [NC-18, 11-74b]: a river entering the sea about 40 miles east of Santa Marta. The mountain forest here comes

down bodily to the coast, where there are sand-beaches and mangrove-swamps; the country is low and damp. There are small tracts of open grass land near the river mouth.

14. Don Diego [NC-18, 11-74b]: plantation on the coast at the mouth of the river *Don Diego*, five miles east of the *Buritaca* and with similar surface and vegetation.

15. Minca [NC-18, 11-74a]: plantation on the river *Gaira*, 12 miles southeast of Santa Marta, at the lower border of the main mountain forest, which here adjoins dry forest and open grass lands. Elevation 2000 feet.

16. Agua Dulce (?): plantation 2 miles southeast of Minca, at 2400 feet; large clearings in mountain forest.

17. Valparaiso (?): plantation near the head of the river *Gaira*, 20 miles southeast of Santa Marta, 4500 feet. Extensive clearings in the mountain forest. Las Purtidas is a locality near it at 3500 feet.

18. El Libano (?): Cerro del Libano, or Sierra del Libano (names used by American planters): this is a locality rather than a mountain, and we camped there for several weeks. The camp was in a valley of the San Lorenzo mountain range, 5 miles southeast of Valparaiso and about 25 miles from Santa Marta; elevation about 5500 feet. The forest here is very dense and luxuriant, only broken by two small clearings; collections were mainly from rocky mountain sides, 5000 to 6500 feet.

19. Cienega, or La Cienega [Ciénaga; NC-18, 11-74a]: town on the coast adjoining the great lagoon of the same name; the lagoon belongs to the estuary system of the *Magdalena*; The country around is flat, swampy in places, and with salt plains, two or three miles back are dry hills with a scrubby growth (dry forest vegetation). Rio Frio [Río frío; NC-18, 11-74c] is a town a few miles south of Cienega, on a river of the same name; Gaira, on the *Gaira River* [NC-18, 11-74a], is between Cienega and Santa Marta, on low land. These towns are connected by a railroad."

On his return to the United States, Smith resumed the curatorship of the Carnegie Museum, but later moved to Wetumpka, Alabama, to collect molluscs. In 1910 he was appointed curator of the Alabama Museum, remaining in that position for almost a decade.

He died on 22 March 1919, in Tuscaloosa, Alabama, caught by a train.

His collections made in Brazil (especially in Mato Grosso) comprised 5000 species of Hymenoptera (studied by Ashmead,

Cresson, and others), 2500 of Diptera (mostly described by Williston), 2600 of Lepidoptera (studied by Godman and Druce), 23,000 of Coleoptera (studied in part by Champion, but mostly left unstudied), 3300 of Hemiptera (studied by Uhler and Distant), 600 of Orthoptera, 300 of Neuroptera (*sensu lato*), 2000 of Arachnida, and 250 of Crustacea (Holland, 1919a, 1919b).

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*Chapter XXIII*

## The trip of E. E. Austen to the Brazilian Amazonia

"In the autumn [of 1895] Mr. Alexander Siemens, of the firm Messrs. Siemens, Bros. & Co., Limited, of Woolwich, being about to proceed to the Amazon in command of an expedition for the purpose of laying a telegraph-cable from Pará [Belém] to Manaos, and having been much interested by the perusal of the well-known works of Bates and Wallace on the fauna of this particular region of the South American continent, thought that the expedition would afford an excellent opportunity in increasing the national collections. Mr. Siemens accordingly made a most public-spirited offer to the Trustees of the British Museum to the effect that, should they desire to avail themselves of the opportunity, he would be pleased to take on board the ship, the Cable S. S. 'Faraday', a member of the Museum staff in order to make collections, at the various localities in the river with which telegraphic connections would have to be effected. Needless to say, the Trustees accepted the offer in the spirit in which it was made, and through the kindness of Sir Wm. Flower I was selected to represent the Museum, the Trustees granting me the necessary leave of absence. Subsequently, in order that the Museum might benefit to the fullest possible extent, Mr. Siemens consented to take a second naturalist, in the person of Mr. F. O. Pickard Cambridge, who, by the boundless enthusiasm and

untiring energy with which he threw himself into the labour of collecting, more than justified the selection."

Thus begins Austen's report on his Amazonian expedition. The man that the Trustees had selected to go to Brazil, ERNEST EDWARD AUSTEN, "Major Austen", was born in London on 19 October 1867. He studied at Rugby and Heidelberg (Germany) and became a member of the British Museum staff in 1889. Upon his return from Brazil, he went in 1899 with a Tropical Medicine Expedition to Sierra Leona. In 1927 he was appointed head of the Entomological Department of the British Museum. His papers are well-known among dipterists (see Smart, 1945, for bibliography).

According to his narrative: "The 'Faraday', a vessel of 5,000 tons, sailed from Gravesend on December 13, 1895, and reached Pará [Belém] on Jan. 4, 1896, after calling on the way at St. Vincent, in the Cape Verde Is., where we had a most enjoyable day's collecting on Dec. 26.

"... The 'Faraday' remained at anchor in the *Pará River*, about two miles below the city, from Jan. 4th until the 10th. We were thus enabled to collect for several days in a clearing in the forest about three-quarters of a mile from our anchorage, besides paying what was unfortunately, a very hurried visit to the Pará Museum. This institution (...) under the energetic supervision of the present Director, Dr. E. A. Goeldi (...) would do credit to any European city..."

"On Jan. 10th we left Pará for the Amazon, laying out cable as we went, and on Jan. 13th reached Breves [SA-22, 50-2a], a small town in the great island of Marajó, situated near the commencement of the network of narrow channels which connect the *Pará River* with the *Amazon*. At Breves we had a day's collecting, considerably troubled by uncertainty as to the hour at which the ship would proceed on her way. On the afternoon of the following day (Jan. 14th) we ran aground on a mudbank at the western end of a channel known as the *Paraná de Buyussu* (*Furo Buiuçu*, SA-22, 50-2a), and remained there hard and fast until Jan. 20th, when we were towed off, only to run aground again on the following day in almost the same place, so that we did not get away finally until high-tide on the morning of Jan. 22nd. This delay, however annoying from a cable-laying point of view, was to a naturalist anything but unwelcome, and we turned it to good account. [Several new species of flies were collected in that occasion; see, for instance, Hendel, 1912]. No further mishaps occurred on the upward voyage, and we reached Manaos (Manaus; SA-20, 60-3c; SA-21, 60-3d), our destination,

at the mouth of the *Rio Negro*, about 1,000 miles from Pará (Belém), on Feb. 8th, after calling on our way at Gurupá (SA-22, 52-1d), Monte Alegre (SA-21, 54-2a), Santarém (SA-21, 55-2d), Óbidos (SA-21, 55-2a), Parintins (SA-21, 57-3b), and Itacoatiara (SA-21, 58-3c). At each of these places we had from one to two days collecting, according to the time occupied by the cable operations, with the exception of Santarém, where we remained for four days and a half. We left Manaos on the downward voyage on Feb. 15th, proceeded two days earlier by Mr. Pickard Cambridge, who had decided to return to Santarém in order to stay a fortnight in the forest some nine miles inland from that town, at a cottage which had been most kindly placed at our disposal my Mr. Wallace, an American trader. After due consideration I had decided to remain with the ship, in order to visit the localities by dividing our forces. On the downward voyage we ran aground in mid-stream near Monte Alegre, and remained there for four days before getting off. Unfortunately I was suffering at the time from a swollen foot, and being scarcely able to walk I was unable to profit by this delay. After another day's collecting at Gurupá, we reached Macapá (NA-22, 51-0b; in the Territory of Amapá), on the northern shore on Feb. 24, and I was enabled to collect for a day at the locality which, so far as I am aware, had not been visited before by a European naturalist. Thence, after calling at Chaves (SA-22, 50-0d), in the island of Marajó, and again at Breves (SA-22, 50-2a), we returned to somewhere near our old anchorage in the *Pará River* on March 5th, and the expedition was nearly at an end. Connections, however, still had to be made with a few places in the vicinity of Pará (Belém), and, as it was expected that these operations would take at least a fortnight, I resolved to avail myself of an opportunity which occurred on the following day of going to stay for some time at Mosqueiro (SA-22, 48-1c), a little place seventeen miles below Pará (Belém) on the same shore, in order to make the utmost of the time that still remained for collecting. I remained there until March 16th, when the 'Fadaray' arrived, and I returned on her to our anchorage below Pará (Belém). During the second half of my stay at Mosqueiro work was much interfered with by rain. Mr. Pickard Cambridge, who had already returned from Santarém, now rejoined the ship, and the next few days were occupied mainly in preparations for the homeward voyage. We sailed from Pará at 6 P. M. on March 24th, and reached Gravesand on the morning of April 14th."

"On referring to my diary I find that although we spent rather more than eleven weeks (79 days) on the Amazon and the

*Pará River* (...) the actual number of days on which I was able to collect ashore amounted (...) to only five weeks (35 days) (...). On the other hand, the days spent in steaming from place to place, and others in which we were unable to land, were by no means wasted, since the numbers of insects which were attracted to the ship's electric lights at night kept me pretty busily occupied."

"The total number of Insects of all Orders collected amounted to about 2,500 (...). Of the specimens obtained of the various Orders the Diptera form the largest individual total (467) (...). Although after dark all the lighted parts of the ship's electric lights formed more or less happy hunting-grounds, two reflectors, each containing six glow-lamps of 16 candle-power, which hung over the 'Faraday' stern were the most productive. Of these nocturnal visitants [attracted by the lights] a small species of the Horse Fly (*Tabanus*) also came in large numbers, besides certains other smaller Diptera, all of which are usually supposed to be diurnal." (Austen, 1896).

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*Chapter XXIV*

## Osten Sacken, Williston, Aldrich and Hunter

### C. R. Osten Sacken

Karl Robert Romanovitch, Baron von den Osten Sacken, commonly known as C. R. Osten Sacken, was born in St. Petersburg on 21 August 1828. He began at the early age of eleven to take an interest in entomology. It was during a temporary residence with his mother in Baden-Baden (1838-39) that he met Joseph Nikolaievitch Schatiloff, who gave him his first instruction in collecting Coleoptera.

Later on, in St. Petersburg, where he received his education and entered (in 1849) into the service of the Imperial Foreign Office, he made collections in all orders of insects, except Lepidoptera.

In 1856 he was appointed Secretary of the Russian Legation in Washington and started for his destination in the first day of April of that year. During his journey, which lasted two months, he made the acquaintance of the principal entomologists and zoologists in the cities he visited. At Königsberg, Prussia, he met Dr. H. A. Hagen, and formed an acquaintance which ripened later into a lifelong friendship and became of great importance for American dipterology. Some of the German entomologists — Klug and Ruthe (Berlin), Kiesenwetter (Dresden), Schiner, Brauer, Kolenati (Vienna), C. A. Dohrn (Stettin) — he had already

met during an earlier journey in 1852-53. In Berlin he had a long and interesting interview with Alexander von Humboldt in his house, but the conversation had little to do with entomology. Although eighty-seven years old at that time, and much bent by age, Humboldt was remarkably active, both physically and mentally.

In the course of his further journey, Osten Sacken visited Winnertz at Crefeld, Baron de Selys Longchamp, Candèze and others in Belgium, and Wulp and Snellen van Vollenhoven in Holland. In London he made (and in part renewed) acquaintance with the principal entomologists, some of whom he remembered having met before during a visit to England in 1852 (Westwood, Stainton, Francis Walker, Adam White, etc.). In the beginning of June he embarked at Liverpool on the steamer 'Arabia', and landed in New York after a passage of thirteen days.

Osten Sacken had corresponded with Hermann Loew as early as 1850 or 1851, when he was still living in St. Petersburg. The tone of Loew's letters not having been very encouraging, the correspondence was not continued. In 1856, Loew heard from Hagen of Osten Sacken's appointment as Secretary of the Legation in Washington, and suddenly displayed the greatest eagerness to renew their correspondence. He wrote Osten Sacken (Meseritz, 11 April 1856) a most urgent letter, expressing the hope that Osten Sacken would send him American Diptera, and complaining of his isolation, principally caused by his quarrel with C. A. Dohrn, President of the Stettin Entomological Society, who, as Loew contended, had him "systematically cut off from all the sources of supply of material for work, which he formerly received through the medium of the Society". Loew, on that occasion, sent Osten Sacken his recently published paper on Bombyliidae and concluded his letter with a characteristic flourish: "It is a pleasure for me to think that, during the probably tedious Atlantic passage, or perhaps even on American soil, you will cast a glance on the lines of my composition, and recall my request that you should be for me a Count von Hoffmannsegg, while, in truth, I am not immodest enough to compare myself with Master Meigen."

Osten Sacken remained in Washington until 1862; in that year he was appointed Consul General of Russia in New York, which thus became his residence between 1862 and 1871. He resigned his post in 1871 and made several journeys to Europe and back until, in the autumn of 1873 (this time as a private citizen), he again settled in the United States, where he remained

till 1877. These twenty-one years were, as regards entomology, principally devoted, in collaboration with Loew, to the task of working up the Diptera of North America north of the Isthmus of Panama. A great deal of his time was spent in acting as a purveyor of material for Loew to work upon, and as a translator and editor of his manuscripts.

Osten Sacken's first task upon arriving to Washington was to compile a "Catalogue of all the previously described species of the Diptera of North America." It was accepted for publication by the Smithsonian Institution, and appeared in 1858.

During the winter of 1857-58 he visited Cuba, where he spent five weeks, and returned by way of New Orleans, Montgomery, Ala., Savannah, and Florida. Although the season was not the best for collecting, he brought many specimens home, especially from Florida. In Havana he made the acquaintance of Prof. Felipe Poey.

More than two years passed after Loew's letter, during which Osten Sacken heard nothing from him although he had written him several times, and had sent him a first consignment of Diptera, as well as a copy of his Catalogue of North American Diptera, which he had published in the meantime. The solution of this mystery came in a letter, dated from Meseritz, 1 October 1858, Loew, probably in consequence of some vague association in his mind between the United States and the Declaration of Independence, had directed his letters to the Russian Legation in Philadelphia, without having noticed that Osten Sacken's letters were always dated from Washington. After a long interval the letters were returned to him by the Post Office, and he had the mortification of sending them back to Osten Sacken with a doleful explanation.

Finally they came to the following agreement: Osten Sacken promised to send to Loew as much material as he could, on the condition, however, that he should consider the collection thus gradually accumulating in his hands not as his property, but as a trust. Osten Sacken's purpose was by this means, to form a collection of North American Diptera containing the type-specimens described by Loew, as well as specimens determined by him from earlier authors, and, as the case might be, an abundant supply of as yet undescribed undetermined specimens. Such a collection, Osten Sacken conceived, would sooner or later be brought back to the United States to form a solid foundation for the further study of the American fauna. This scheme enabled him to receive without stint the numerous contributions in collections and specimens which were most generously put at his

disposal by different collectors during his long residence in the United States.

This scheme came to a successful conclusion, principally in consequence of the generous intervention of Louis Agassiz. In 1877 this collection contained about 1350 species described by Loew, 330 species described by earlier authors and a large number of undescribed species, forming a total of about 3,000 species, which came back to the United States and was safely housed in the Museum of Comparative Zoology in Cambridge, Mass. At the same time Loew received from the Museum a liberal remuneration for his work on the collection.

In consequence of his arrangement with Loew, Osten Sacken's principal efforts after 1856 consisted in procuring him materials to describe, and in translating and editing his manuscripts. It required some abnegation on Osten Sacken's part to impose himself this laborious (and comparatively subordinate) part of a middle-man, occupied as he otherwise was with his official and social duties.

From that arrangement, resulted Loew's three volumes "Monographs of North American Diptera" (1862, 1864, 1873).

In 1871 Osten Sacken resigned his post of Consul General of Russia in New York, and remained a part of the following two years in Europe. In September 1873 he returned to the United States, and spent the interval between this year and 1875 principally working at the Diptera of the Museum of Comparative Zoology, where he had deposited his collections during his absence, and in preparing materials for the projected new edition of his Catalogue of North American Diptera. Between December 1875 and September 1876 he made a journey to California, the Sierra Nevada, and the Rocky Mountains, whence he brought back considerable collections. A portion of the collection of Californian Diptera was worked up by him in his "Western Diptera" (1877), after which publication he had farewell (and this time for good) to the United States, and sailed in June for Europe.

One of the first duties he had to fulfill, after his return to Europe, was to go to Guben, the residence of Loew, and to secure the shipment to the United States of the large collection of North American Diptera which, for the last twenty years, had been accumulating in his hands; an arduous and risky business for him to undertake, but one which was nevertheless successfully accomplished. The whole collection arrived safely in Boston (in the autumn of 1877), and was deposited in the Museum of Comparative Zoology. With this transfer, and the almost simultaneous publication of the second edition of his Catalogue of



Botafogo Bay, Rio de Janeiro, Guanabara (Rugendas)



North American Diptera (1878), the principal object of his entomological labor in the United States was fulfilled.

After returning to Europe, Osten Sacken felt that his labors in descriptive entomology were practically at an end. He continued to publish papers on the larger phases of classification, on insect habits, historical researches on entomology, etc., up to a few years before his death. In 1886-87 he published 216 pages of volume one of the Diptera in the *Biologia Centrali-Americana*. In 1903 he published his "Record of my life in Entomology", which gives not only a review of his own activity, but includes critical estimates of several contemporary entomologists, and much historical matter on dipterology in general. For his European residence he had selected Heidelberg, where he died on 20 May 1906 (Aldrich, 1906; Alexander, 1970; Johnson, 1906; Osten Sacken, 1903).

### S. W. Williston

Samuel Wendell Williston was born in Boston on 10 July 1852, and was therefore a little past 66 years old when he died in Chicago on 30 August 1918. At the time of his death and for some years he was Professor of Paleontology and Director of the Walker Museum in the University of Chicago.

His father was a blacksmith, uneducated, but of native ability, who removed with his family to Manhattan, Kansas, in 1857. Here young Williston's boyhood was spent and in due time he entered the Agricultural College in his home town, graduating from it in 1872. But his college course was interrupted, for he ran away from home at 18 and went to work as a railroad laborer, from which humble position he rose before he was 20 to be a transit man at a handsome salary for that time. However, he suffered greatly from malaria, and had to resign and go back home; after recuperating he finished his college course. Railroad engineering went flat in the panic of 1873, and he began to study medicine, "reading" in the office of a local doctor. In the summers of 1874 and 1875 he assisted Professor B. F. Mudge on fossil-collecting expeditions in Western Kansas, the work being done for Prof. Marsh of Yale University. He spent the winter of 1875-6 in the medical school of the University of Iowa, and was invited to come to Yale to see Marsh in the spring; this resulted in a contract to work for Marsh for three years at \$40.00 a month, and in all to almost continuous employment with him for nine years, until 1885. He managed to finish his medical course and get his M. D. at Yale in 1880. But by this

time his scientific bent was strongly developed, and it soon appeared that his work lay in following it rather than in the practice of medicine. He specialized in paleontology, and received his Ph.D. under Marsh in 1885. His genius for anatomy led to an appointment as demonstrator in Yale Medical School the following year, and, after a short apprenticeship, to full professorship in human anatomy in 1887 — a striking recognition of his ability.

After three years in this position, he accepted a call to the University of Kansas in 1890, as professor of historical geology and paleontology. Twelve years of his prime were spent in this institution, years crowded with productive labors. He helped organize the medical department of the University, and took on the deanship of it along with his other work; this almost broke his vigorous health, and he had to slacken his pace — perhaps never quite again regaining it.

The consciousness that he was working beyond his strength had something to do with his going to the University of Chicago in 1902, as professor of paleontology. Here he was able to concentrate on a single specialty, officially at least, as he left medicine behind and though he had left entomology also. In this place he spent the last 14 years of his life, beginning under some unexpected handicaps and gradually working up to full recognition and honor.

In the outline just given, entomology is hardly hinted at, for the reason that Williston never held an official entomological position. But he found time to do much valuable work as a pioneer in dipteroLOGY. His employer would not allow him to publish in paleontology, and he sought a field outside where he could be free to work and publish; this he found in the Diptera. His interest in the flies began to be serious about 1878. At this time Osten Sacken had returned to Europe, and there was not a single American student of the Order, except Edward Burgess, the Boston yacht designer, who published only one small paper. So Williston was virtually alone on the continent. In the absence of guidance, he plowed his way by main strength through descriptions of species until here and there he made an identification, which served as an anchor point for a new offensive. He had few definitions of genera, so had to work backward from the species. After a year or two of this tedious and time-wasting effort he came upon Schiner's "Fauna Austriaca", in which the Austrian families, genera and species of Diptera as known up to 1862-4 are analytically arranged and succinctly described. To his immense relief and satisfaction, he now found that all his American flies could be traced to their families, and most of them to their proper

genera, in this fine work. He was so impressed by the save of time accomplished that his own publications coming later show the effect of this early experience on every page; everywhere he has the beginner in mind and is clearing the way for him.

In a few years he began publishing tentative papers analyzing the American families and genera of the flies. These he extended and enlarged in a pamphlet in 1888 and again, in a bound volume in 1896; and in 1908 published a third edition, still more complete, with 1000 figures, of which 800 were made with his own hand, his well-known "Manual of North American Diptera". From necessity he published it at his own expense; it was eighth years before the receipts from sale covered the cost of printing, but happily he lived to see this consummation.

From 1890 his more important papers were concerned with tropical Diptera (Mexico, St. Vincent, Brazil), and with bibliography. As his official duties grew more exacting, he gradually abandoned entomology, but he had as many farewell appearances as an opera singer, for he could not resist the temptation to come back again and again.

His deep interest in genera and his wide acquaintance with them, together with his universally recognized taxonomic ability, made him the peer of Osten Sacken, Brauer, and others, in the period 1890-1900, as a world authority in Diptera.

The types of Williston's new species are much scattered. His Syrphidae were acquired by the U.S. National Museum; the rest of his earlier collections by the University of Kansas; his Biologia material and that from St. Vincent went to London (British Museum); the American Museum of Natural History, New York, obtained his latter collections, including some duplicates of type-series from St. Vincent and Mexico.

Williston did not believe in designating a single type-specimen, hence in some cases his types of the same species are in two museums. He had no collection of Diptera in his last years, although he still retained his fine library in the Order.

In his last few years Williston published two volumes on fossil reptiles, his greatest specialty, and his last winter he was working on a handbook on Reptilia, which was probably near completion when he was compelled to abandon it.

His last years were full of honors. He was a delegate to the International Zoological Congress at Monaco; Yale University gave him a honorary D. Sc.; he was chosen to the limited membership of the National Academy of Sciences, and the Entomological Society of America made him an Honorary Fellow, one of the seven out of its membership of 600.

He was married in 1880 to Annie I. Hatheway, of New Haven, who survived him with three daughters and a son (Aldrich, 1918; Shor, 1971).

### J. M. Aldrich

John Merton Aldrich was born at Rochester, Olmster Co., in Minnesota, on 28 January 1866, where he spent his childhood. In 1881, at the age of 15, his people moved to eastern South Dakota, near the Minnesota state border. He had a very brief high school career, in 1884 and 1885, and later attended the State Agricultural College at Brookings, South Dakota, where he worked his own way through school. It was a new school in a new country, and began on a very small scale. However most of the student body were working their way and eager to learn, while the faculty was composed of friendly and helpful people; Aldrich received in three years of this kind of atmosphere an intellectual impetus which is not always imparted in the largest universities. Aldrich did not receive any important body of facts to carry away. His progress through the institution was accelerated by the desire of the President to have a graduating class in 1888, as a result of which he received his regree in three years. Entomology first came within his ken in the last term of college, when a course was given by Prof. I. H. Orcutt, a medical doctor who had put on the faculty and given a large field in biology. The worthy doctor had never studied entomology himself, but he was wise enough to turn the students loose with the insects, and Aldrich made a considerable collection and enjoyed the course immensely, but without the least thought that he might continue the subject, still less find his life work in it.

After graduating, still at sea in regard to his next move, Aldrich, like a number of the other students, decided to canvass for a book to get a little ready money. Three days of this was enough to convince him that he was not made for a book agent, and he went back to his father's farm to assist in the harvest. A few days later, while schocking up wheat, the idea crossed his mind that Professor Orcutt, who had become entomologist of the newly established Agricultural Experiment Station in addition to his teaching duties, really needed an assistant, and that an opening here might lead to an attractive field of activity. So he wrote to Doctor Orcutt, who consulted the President and wrote back that young Aldrich should study entomology through the winter, and

in the spring they would see what could be done. With this much encouragement the young man taught a term of school to get a little money, and in late fall made his way to the University of Minnesota to take up entomology again. This university had then about 500 students, ranking well in size among the western institutions. President Cyrus Northrup, after the manner of the time, interviewed all the new students personally; he said they had no courses in entomology, but out at the Experiment Station at St. Anthony Park they had a very able entomologist, Otto Lugger, who would perhaps give a student private instruction during the winter. So Aldrich went out to St. Anthony Park armed with a letter from the President, and was readily accepted as a student by Lugger. Arrangements were made to eat at the new School of Agriculture nearby, and sleeping accommodations were found in a cold room used by laborers in summer. Lugger originally was a German coleopterist and had a fine collection well mounted; he had been employed by Riley in Missouri, and after some years had been in the Division of Entomology staff in Washington for a short time before coming to Minnesota a year or two before 1888. The winter's work leaned rather heavily on Leconte and Horn's "Classification of the Coleoptera of North America", but the student could not fail to absorb some of the enthusiasm of the teacher, who was a born naturalist.

In the spring, after considerable delay, the young aspirant was given a three months' engagement at the Agricultural College at Brookings, at \$40.00 a month. In the fall he was put on the staff with an annual appointment at \$500.00, with the understanding that he would devote his winters to study.

Where to go to study entomology in the fall of 1889 was one of the first questions that arose, and was decided in favor of the Michigan Agricultural College; there was very little choice at that time, especially as the young student had not heard of Cornell University except in very vague terms. In November he started for Lansing, Mich., and spent the winter with a group of ten young men, who, under Prof. A. J. Cook, were doing what was then believed to be advanced work in entomology. Prof. Cook was an excellent teacher and a keen practical man of affairs, with tremendous energy. He advised young Aldrich to select a single order as a specialty, and to proceed at once to get together a library and collection; he also suggested the Diptera as a large order in which there were but two workers (Williston and Coquillett) at the time in the country. The advice was accepted, and the library and collection duly begun, in the spring of 1890. Williston sent him his reprints, as did Coquillett and Osten

Sacken, and he began buying at an alarming rate out of his small salary.

Returning to South Dakota for the year's work, Aldrich collected as many Diptera as possible, and arranged in the fall with Professor Hagen to spend the following winter at the Museum of Comparative Zoology at Harvard in a study of the Loew-Osten Sacken collection of Diptera, then the only one of any importance in the United States. In November he started east with this object in view, first stopping in Ames, Iowa, to become acquainted with Osborn and Gillette. He accompanied both of the entomologists to Champaign, Illinois, to attend a meeting of the recently organized Association of Economic Entomologists. Professor Osborn shared his sleeping-car berth en route with the impecunious student, a characteristic act of kindness never forgotten.

Arriving at Harvard University, he was informed by the registrar, Frank Bolles, that Professor Hagen had suffered a stroke of paralysis and his department had been closed, making it impossible for anyone to study the collections. This was a severe blow, as it was hard to arrange any other plan for the winter without far exceeding the available funds of the student. In explaining his situation to the sympathetic registrar, Aldrich happened to allude to his graduation from the South Dakota Agricultural College; this had a remarkable effect, for Harvard University at that time was very ambitious to develop a strong graduate department and any sort of a degree meant a great deal in a student. So Mr. Bolles began to plan to secure from Alexander Agassiz some concession which would permit Aldrich to remain. Following the directions of Bolles, he went to Agassiz's door expecting to see him, but was kept waiting outside while a secretary went in and explained his broken plans. After a time she came back and opened the door sufficiently to say that Mr. Agassiz could do nothing about the matter. Mr. Bolles later interviewed Agassiz himself with no results, and a letter of explanation from Aldrich to Agassiz, suggested by Bolles, brought out a printed postal card denying the request.

Forced to abandon his winter's plans, Aldrich started for Washington to see the collections there, but on the way stopped at Brown University to see Professor Packard, who was most friendly and hospitable, and took the young entomologist home to dinner, after which they spent the evening in the library, and Packard showed materials for future publications, which he was preparing. It was the first glimpse into the field of real science, and made a profound impression on the westerner.

Arriving in Washington early one morning in late November, Aldrich waited for the opening of business and pawned his watch for \$5.00, after which he ate breakfast and shortly made his way to the Division of Entomology. Doctor Howard took him in charge, suggested a place to stay and arranged about his work in the National Museum, where the collection of insects was. The main part of the collection of Diptera was in the Syrphidae, where Williston's types were deposited. With these and such other material as had been accumulated, Aldrich spent three profitable weeks. A meeting of the Entomological Society occurred in this period, which he attended on the invitation of Doctor Howard. It was in a private house, and the small room was soon so full of tobacco smoke that at the conclusion the visitor was obliged to seek fresh air, without sharing in the social hour which was then an outstanding feature. His money exhausted, Aldrich returned home and spent the remaining of the winter classifying his flies with the help of the library he had accumulated.

The following winter was spent at home, as his collections and library had then assumed enough importance to justify all the time he could spend upon them.

In the summer of 1892 he had his first real collecting trip, a small appropriation having been secured for a trip to the Black Hills during some three or four weeks. In the Hills he joined a party from the University of Nebraska, under the management of Professor Bruner.

Conditions in the college had become disturbed, owing to factional strife, Professor Orcutt had become involved as an opponent of the President. In November several removals from the faculty took place, and among those to go were Orcutt and Aldrich. It did not take a young dipterist of those days long to decide that the proper course lay in joining Williston in the University of Kansas; so about New Year's he arrived at Lawrence, where Williston received him with open arms and he spent the rest of the year adding a little other work to his main study of Diptera. It was in the last June, after the close of the college year, that he was appointed Professor of Biology in the University of Idaho (1897).

Aldrich then married Ellen Row, of Brookings, South Dakota, and moved to Moscow, Idaho. The loss of his wife and infant son four years later caused him to plunge most deeply in his dipterological work, and he began his card catalogue of the literature on Diptera, a project to which he contributed almost daily until his last illness. By 1905, when this catalogue had reached publication size and was about ready for submission to

the Smithsonian Institution, Aldrich married Della Smith, of Moscow, Idaho, and securing sabbatical leave of absence from Idaho went to Stanford University for a year. His Ph. D. degree was awarded by Stanford in 1906. Fortunately Aldrich had moved his collection and library of Diptera to his father's house, because during his absence the University of Idaho burned to the ground. Idaho's self-inflicted loss proved to be the nation's gain. Dr. Howard immediately appointed Aldrich to the Bureau of Entomology. The death of Frederick Knab in 1918 made it necessary to transfer Aldrich to the National Museum, where he was appointed Custodian of Diptera and Associate Curator.

In 1928 Aldrich presented to the National Museum his personal collection of Diptera, numbering 45,000 specimens and 4,000 named species. With this he donated the unique and extensive card catalogue of Diptera. This index is the source of information on all the literature of all the American Diptera, and with its cross-references to synonymy is invaluable to all workers. His library was the most complete assemblage of books and articles on Diptera.

Aldrich contributed many papers to the knowledge of the Diptera, and especially the chapter on Dolichopodidae to Williston's Manual (1908), and to the Biologia Centrali-Americana (1896, 1901). He also published on the Dolichopodidae and Phoridae for the "Diptera of St. Vincent". His catalogue of North American Diptera (1905) will remain forever as one of the monuments in dipterology.

He died on 27 May 1934 (Aldrich, 1930; Melander, 1934).

#### W. D. Hunter

Walter David Hunter was born at Lincoln, Nebraska, on 14 December 1875, and died suddenly at El Paso, Texas, on 14 October 1925. His father's parents came to America about 1825, first at Perry, New York, afterwards moving to Rockfort, Illinois, and the family moved later to Lincoln, Nebraska.

Hunter's father, who was a lawyer and ranked highly in his profession, died, a young man, in April 1880, when Hunter was four years old. Hunter entered the preparatory school of the University of Nebraska at the age of fourteen, and graduated from the University with the degree of A. B. in 1895; before his twentieth birthday.

In the University he soon began work under Prof. Lawrence Bruner, first on ornithology and taxidermy, but he was soon held by his teacher's enthusiasm into a closer study of insects. He seems to have been the most capable and prominent of Bruner's students, since he stayed with him after graduation and became an instructor, continuing his work all the time and receiving the degree of Master of Arts in 1897.

His first published papers (1896-97) were on Syrphidae. His works as an instructor and as Bruner's righthand man led him quickly into applied entomology. In 1897-98 the entomological service of the Federal Department of Agriculture commissioned him to undertake several studies of pests in the United States.

In 1900 the Supreme Court of Nebraska rendered a decision by which the State University was deprived of certain incomes, and the regents economized by cutting out as many assistants as possible and by reducing expenses in every way. All of Professor Bruner's assistants were cut off, and Hunter was left on the 1st of July without a position. It happened that just at this time Prof. H. E. Summers, entomologist of the Iowa State College of Agriculture at Ames, needed an assistant, but could pay only four hundred dollars a year. Hunter could have gone into teaching with four times this salary, or he could have listened to the urgings of relatives and gone into commercial work at a good salary, and his mother wanted him to be a lawyer as his father had been (in fact he studied law for a short time in the office of his father's partner); but, as Hunter wrote at that time, he had seen so many men leave science, temporarily as they thought, to make a little money, who were never able to get back to scientific work, that he decided to accept the sacrifice and stay in the work he loved even at a rate of compensation which, while it might buy his bread and butter, would do little more.

In the meantime, the cotton boll-weevil problem in South Texas was becoming very serious. Hunter, on account of the excellent record he had made in his summer investigations of 1897 and 1898, was chosen as a competent entomologist to study the problem. He came to Washington early in March, 1901, and was sent at once to Texas. After thorough investigations, lasting many months, he established headquarters at Victoria, Texas. While at Victoria he married Mary P. Smith. With the progress of the weevil to the north, he moved to Dallas in 1905. In 1909 a laboratory was started at Tallulah, Louisiana, the Dallas station being abandoned for this purpose.

Later he became greatly interested in medical entomology. He was made President of the Association of Economic Entomologists and President of the Entomological Society of Washington (1915).

Hunter's great contribution to Neotropical Dipterology was made through the publication of his catalogue of South American Diptera (1900-1901) (Howard, 1925).

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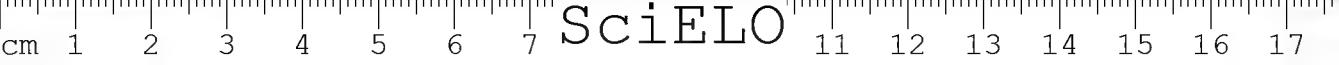
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*Chapter XXV*

## The Biologia Centrali Americana

Osbert Salvin, the second son of Mr. Anthony Salvin, an eminent architect, was born at Finchly in 1835 and educated at Westminster and Cambridge. He developed a very early taste for natural history.

Frederick DuCane Godman, third son of Joseph Godman, of Park Hatch, Surrey, was born in January 1834, and at the age of ten went to Eton, but three years later a very severe attack of what was then called low fever necessitated his removal, and for some years he was unable to work at all. When his health was sufficiently reestablished, he received instructions from tutors until he was eighteen years old, when he made a trip to the Mediterranean and Black Sea, visiting Gibraltar, Southern Spain, Athens and Constantinople. During the time spent at home he interested himself in natural history, paying special attention to British mosses and ferns.

In 1853 Godman entered Trinity College, Cambridge, as an undergraduate, and Salvin, in the following year, went to Trinity Hall, of which college he became a scholar; he graduated as a Senior Optime in the mathematical tripos and was afterwards made an Honorary Fellow. With similar tastes, it was only natural that they met and soon became fast friends, thus forming that close intimacy which only terminated with Salvin's death on 1 June 1898.

During their College days Salvin and Godman made frequent expeditions together to the fens and other places in the neighborhood of Cambridge, in order to collect bird's eggs and Lepidoptera. They also spent their leisure hours in Baker's shop, a well known bird stuffer in the Trumpington Road, skinning and setting up birds — an experience which they found of great service afterwards when in Central America and other expeditions.

In 1857 Salvin made a bird nesting expedition with the Rev. H. B. Tristram and Mr. W. H. Simpson through Tunisia and eastern Algeria, in which Godman was to have joined them, but an accident in the hunting-field laid him up for some weeks and prevented him from accompanying them. Later in the year, when Godman was sufficiently recovered from his accident, he went with his brother Percy to Bodö, in the north of Norway; there they remained for some weeks exploring the surrounding country. Taking the steamer northward to the Atlen River, they crossed Lapland on foot to Haparanda, on the Gulf of Botnia. Before returning home they visited Stockholm, St. Petersburg and Nijni-Novgorod.

In the autumn of 1857 Salvin paid his first visit to Central America, in company with Mr. George Ure Skinner, a collector of birds and orchids, which he had brought from that country on previous expeditions. Salvin undertook the journey at the request of Messrs. Price & Co., to examine and report upon the nuts of a palm which it was thought might be used in the manufacture of candles. The palm-nuts, however, proved to be useless for practical purposes, and Salvin spent the remainder of his time in travelling through the country and making a collection of birds and insects. He reached Belize, British Honduras, in December 1857, and after spending a few days there, proceeded down the coast to Izabal and thence by easy stages to Guatemala City, making Dueñas, 30 miles southwest of the capital, his headquarters for six months. Salvin made two excursions to the Pacific Coast region, and one to the *Lake of Atitlán* in the "Altos". Leaving the country towards the end of June, 1858, he returned to England via San José and Panama.

What he saw, however, on this expedition so wetted his appetite that he returned again to Guatemala in the spring of 1859, with the sole object of studying natural history. He visited Dueñas, and collected in the neighborhood for some months. In October he went to San Gerónimo, Cobán, and other places in Vera Paz, returning to Dueñas about the end of the year. In March, 1860, he was again in Alta Vera Paz, at Cobán, Lanquin, etc., and left for home, via Belize, in the following month.

In August 1861 Godman joined Salvin on his third expedition to Guatemala, and, after spending three weeks in Jamaica enroute, they landed at Belize; thence taking their passage in a coasting skooner they arrived at Izabal on the Golfo Dulce. There they remained a few days, making preparations for their journey engaging Indians and mules to transport themselves and their baggage to the interior.

Crossing the Mico range of mountains, they spent a few days at Quirigua. From Quirigua they again took the mule track, through the valley of the *Motagua River* to Zacapa and thence to Guatemala City. They spent a day or two at the capital and then proceeded to Dueñas, where they remained some weeks at the house of Mr. William Wyld, a friend of Salvin's. Their time was devoted to collecting, chiefly in the high forests of the Volcán de Fuego, the peak of which they ascended, and Godman made a separate expedition to Escuintla in the Pacific cost region.

After their stay in Dueñas, they retraced their steps to the capital, and, crossing the Chuacus range into the plain of Salama, they took abode at the Hacienda de San Gerónimo. There they resided for some weeks, finding several species of birds and insects which they had not previously obtained. From San Gerónimo they went to Cobán, and, after spending some time collecting in the neighborhood, they visited Cubilquitz and Chocatum in the low damp forest of Alta Vera Paz. At Cubilquitz Godman contracted a sharp attack of fever, which obliged him to remain for some days at Cobán to recover, and prevented him accompanying Salvin on his long and arduous journey on foot to Petén.

When Godman had recovered sufficiently he returned to San Gerónimo and then went to Buenaventura on the upper waters of the *Motagua River*, there called the *Rio Grande*, where he employed Indians to poison some nine miles of the water in order to make a collection of the fish.

On his return to the capital he journeyed to the Alotepeque silver-mines in company with the manager, and thence to Copán, Honduras, where, after spending a couple of days in examining the interesting ruins, he proceeded via Zacapa to Izabal, and there met Salvin on his way back from Belize. There they again parted, Godman returning to England, while Salvin started for Dueñas and the interior, passing through the "Altos", staying at Totonicapán and Quetzaltenango, and making expeditions to the Costa Grande, Retalhuleu, and the lagoons of the Pacific coast to

Huamuchal, close to the Mexican frontier. Salvin returned home early in 1863.

In 1865 Salvin married Caroline, daughter of J. Whitaker Maitland, of Essex, and they lived for some years in South Kensington, which became for a time the headquarters of Godman and Salvin museum. Although both Salvin and Godman had jointly collected ever since their undergraduate days, it was not until the material was housed at South Kensington that they really did serious work together; but from thence onwards they spent the greater part of the week in London arranging their collections, publishing papers on them, and attending the meetings of various scientific societies of which they were members.

Salvin's fourth and last visit to Guatemala was made in company with his wife. They sailed in a Royal Mail steamer in April, 1873, touching at St. Thomas and Jamaica, then crossing the Isthmus of Panama they reached the city of Guatemala early in June. Proceeding thence to Dueñas, which became their headquarters for some months, Salvin occupied himself in collecting in the forests of the mountain slopes. Together they ascended the crater of the Volcán de Fuego, and a few days later that of Acatenango. Leaving Dueñas for Atitlán they made the ascent of the peak from Santa Lucia on January 17th. Subsequently they visited Mazatenango, the coffee estate of Las Nubes (Cerro Zunil), Quetzaltenango, the Lake of Atitlán, Sololá, Pantaleón, and San Gerónimo, and after a short stay at the last named place the journey was continued to Cobán. Having revisited the capital they left Guatemala in March, 1874. Again crossing the Isthmus of Panama, they sailed for the United States and visited the museums of New York, Boston, Philadelphia, and Washington, and made the acquaintance of the leading scientific people, returning to England on 4 June 1875.

In the autumn of the same year Salvin was appointed to the curatorship of the Strickland collection of birds at Cambridge, which necessitated his residence at the University. On his giving up the house in South Kensington in 1873, it had become necessary to find quarters for their museum and library, which now occupied considerable amount of space, and they took for this purpose a house in Tenderden Street, Hanover Square, to which they were transferred. The building being rather larger than they required, they shared it with some ornithological friends.

During his stay in Cambridge, Salvin came frequently to Tenderden Street and worked at the collections with Godman, and continued so doing until the death of his father in 1880, when he succeeded to his property at Fenhurst, Sussex, where he after-

wards resided, continuing, however, his work in London as before. In the autumn of 1878 they moved their museum and library to 10, Chandes Street, Cavendish Square and there they remained till after Salvin's death. In 1907 the house at Chandes Street was given up and the library transferred to 45, Pont Street, S. W., while the collections still remaining in their possession were handed over to the British Museum.

In addition to the material obtained during their various visits to Central America and that sent them by the natives they had trained, they found it necessary, for the sake of comparison, to acquire a more thorough knowledge of the South American fauna, and, with that view, employed various expert collectors, whose names are recorded in the body of the work, to visit special localities in Colombia, Ecuador, Peru, Guiana, and other places in South America.

Among the names who appear in the several parts of the *Biologia* as collectors, we have dealt with the following already, in preceding chapters: Sumichrast (see chapter XVIII), Bilimek (see chapter XV), Saussure (see chapter XVIII), Sallé (Vol. I, p. 178), Boucard (Vol. I, p. 179), H. H. Smith (see chapter XXII). Other collectors cited are Morrison (Sonora), Rogers (Costa Rica), Janson (Chontales, Nicaragua), Forrer (N. W. Mexico, Tres Marias Is.), Höge (who collected in all Mexican States, Tamaulipas and Yucatán excepted), Blancaneaux (British Honduras), Stoll (Antigua), Schumann (Mexico), and about whom nothing is known. G. C. Champion explored Central America from 16 March 1879 to 23 March 1883; a very detailed itinerary of his travels was given by Godman (1915: 46-54; the same appeared in *Ent. News* 1907: 46-54). T. Belt explored Nicaragua (1868-1872); the relation of his travels appeared in 1888.

Godman and Salvin continued to receive consignments from those naturalists for several years without having any idea of publishing a connected account of the results, and a very large amount of material, especially amongst the birds and insects, was thus accumulated. It was not till the year 1876 that it was suggested that the "Biologia" should be undertaken, and three years later (September 1879) the first part appeared. In the meantime, various collectors were sent by them to Guatemala and other parts of Central America.

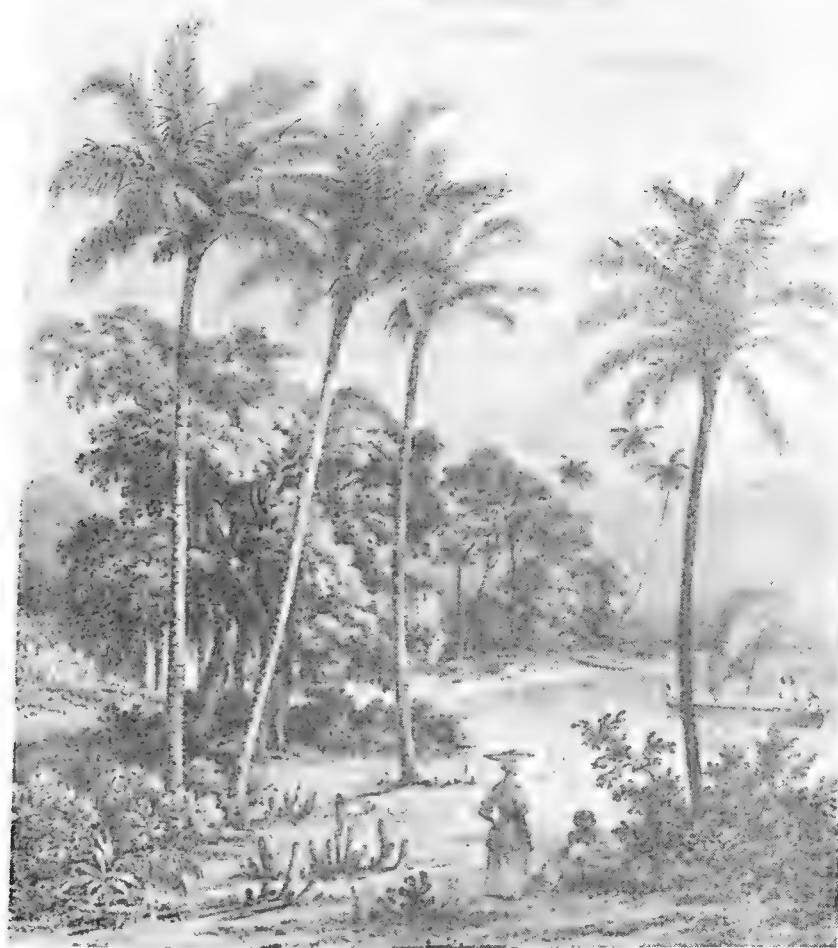
Their method of publication was to bring out six quarto parts a year; each part to contain twelve sheets made up of several subjects with six colored plates, the plates and letterpress so numbered and paged that parts might ultimately be broken up

and bound together in their respective volumes when completed. In this way it was possible to keep several subjects in progress at once, and the plan answered well. They were, however, unable to adhere to the original scheme of completing the work in 60 parts, owing to the ever increasing amount of material received from their collectors — an amount so great that 215 parts of zoology alone have been required, the dates of issue extending over a period of 36 years.

On arrival to England, the various consignments were opened, every specimen labelled with its exact locality, and the name of the collector attached. The animals were then sorted and handed over to specialists to be worked out.

In the autumn of 1887, having been ordered abroad for the benefit of his health, Godman decided to visit Mexico, as he found himself deficient in material from that country than from further south. Crossing the Atlantic to New York he took the train to Mexico City, then a six days' journey, entering the Mexican Republic at El Paso (3700 ft), on the *Rio Grande*. The early part of the journey was passed during the night, but next morning it was evident that a considerably higher elevation had been attained, and on reaching Zacatecas (8000 ft), the aspect of the country was very desolate and unpromising for natural history purposes, and continued much the same for some distance, but improved a little nearer the capital. After spending a few days in Mexico City in making the necessary preparations, he was joined by W. B. Richardson, an American bird-collector, and with him started for the Atlantic coast. The first part of the journey, still on the high plateau, was through fields of "agave" grown for the production of the fermented drink called "pulque", so much beloved by the Mexicans. In about six hours they reached Esperanza, in the State of Puebla, at the eastern edge of the plateau; there the train enters the wonderful gorge by which it descends to Orizaba, Córdoba, Atoyac, and Vera Cruz. The scenery at once changes, the vegetation becoming luxuriant on entering the region of the rainfall.

At Orizaba they spent a few days collecting, and Godman was there joined by Mr. and Mrs. H. H. Smith, who went with him as far as Atoyac, where they remained for some time before crossing the western side of Mexico. Leaving the Smiths at Atoyac, Richardson and Godman continued their journey to Vera Cruz. The land gradually sloping down to the Atlantic and forming a savanna or plain of sandy ground, sparsely covered with grass and shrubs. After spending a few days in collecting, chiefly to the north of the town, they took the mule tram to Jalapa,



View from the coast of Bahia (Rugendas)



which being on higher ground reaps the benefit of the rainfall and the vegetation is far more luxuriant. At this place he engaged Mateo Trujillo, a half-breed Indian, who accompanied him during the greater part of the time he was in Mexico and proved a very skillful collector. They made an excursion to Misantla and Papantla, on the low ground near the coast at the foot of the mountain range, which proved to be very good collecting ground and added considerably to the insects. On leaving Misantla they returned to Jalapa and over to the Cofre de Perote to Esperanza, and thence by train to Mexico City. From the capital Godman made two expeditions, the first in company with Mr. Flohr to the pretty town of Cuernavaca, and thence to the caves of Cacahuamilpa, where he hoped to have found some blind insects. The second and also interesting expedition was to Morelia and Lake Pátzcuaro.

On returning to the capital Godman next visited Yucatán, crossing the Gulf of Campeche from Vera Cruz to Progreso by steamer, thence to Merida by train, where the railway then ended. His first object was to visit the naturalist Dr. Gaumer, who accompanied him to the ruins of Ticul and Uxmal, a distance from Merida of about forty miles, which journey was performed on horseback. Leaving Yucatán he went back to Mexico City, where he was joined by Mr. and Mrs. Elwes, and together they went to Jalapa, thence riding across the country of Córdoba, a journey of three days, and obtaining magnificent views of the Volcano de Orizaba, with its snow-clad peak. They continued their journey to Puebla and Mexico City and thence to Amecameca at the foot of the volcanoes Iztaccíhuatl and Popocatepetl; the latter was ascended as far as the pine belt, where Godman found many interesting insects. They left Mexico in the spring of 1888, having been absent from home about five months, and returned to England via California and New York.

For several years after his return from Mexico Salvin and Godman continued diligently to work out the material, and the ever increasing amount sent over by their collectors. Salvin's failing health finally obliged him to relax his efforts, and though he still came to London as formerly, he was unable to take the same active part in the work and the difficulty of concentrating his attention on any one subject became increasingly great. He died suddenly at Hawksfold, Fernhurst, Sussex, on 1 June 1898, leaving Godman alone to complete the *Biologia*. At the time of Salvin's death, 141 parts of zoology (completing 13 volumes), the whole of the botany (5 volumes), and nine parts of archeology had been issued; since then 74 parts (142-215) of zoology, completing 39 more volumes, and 8 parts of archeology, have been

required, to bring these subjects to a conclusion. Godman took up his pen again, and with G. C. Champion finished several parts.

In 1906 the collections studied to that epoch were handed over to the British Museum (Natural History), and included:

|                                     |        |                                |
|-------------------------------------|--------|--------------------------------|
| Coleoptera:                         | 85,920 | (in a total of 18,029 species) |
| Lepidoptera (Rhopalocera):          | 17,829 |                                |
| Lepidoptera (Heterocera):           | 12,883 |                                |
| Diptera                             | 17,525 |                                |
| Hymenoptera                         | 10,004 |                                |
| Rhynchophora                        | 22,793 |                                |
| Staphylinids and<br>aquatic beetles | 9,474  |                                |
| Odonata                             | 3,000  |                                |
| Homoptera                           | 5,509  |                                |
| Parasitic Hymenoptera               | 6,293  |                                |

From 1906 onwards the remaining collections have been handed over to the Museum as soon as the enumeration of the species was completed; that of the Coleoptera was finished in 1911. Their own general collection of butterflies probably included nearly 100,000 specimens, and the beetles alone from Mexico and Central America perhaps double that number. Besides these, a considerable number of mammals, reptiles, fish, etc., of which no account was kept, was presented to the British Museum (Godman, 1915: 1-12).

The Diptera portion of the *Biologia Centrali Americana* appeared in 3 volumes and one supplement (to Vol. I). In volume I, published from 1886-1887, Baron Osten Sacken contributed alone with 24 families; in the supplement (1900-1901) worked Williston, Aldrich, Wheeler, and Melander. In this first volume and its supplement 997 species are enumerated, 330 of which are described as new. The six colored plates illustrate 120 species. Volume II (1888-1900) was entirely written by Wulp, and deals with the calyptrates. Almost all the specimens were collected by H. H. Smith. The volume was left incomplete after the death of the author in 1899, and the acalyprates and Aschiza were not published. Pages 429-489 (Hippoboscidae and supplement) were published after Wulp's death, although the new species of Calyptratae had already been described by him in the *Tijdschrift voor Entomologie* for 1892. 1905 species were named by the author, of which 585 were treated as new. The 13 colored

plates figure 287 species. Volume III treats the Aschiza, and was written by Williston. Pages 1-89 were published from 1891 to 1892; pages 93-127 and the index for the three volumes in 1903. 325 species are listed, 67 of which described as new. The 2 colored plates show 29 species (Godman, 1915: 77-78).

See Selander & Vaurie (1962) for the Biologia localities.

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*Chapter XXVI*

## The Travels of C. A. W. Schnuse

CARL AUGUST WILHELM SCHNUSE was born on 31 May 1850 in Anhalt-Brenburg, Germany. He became a teacher in a gymnasium (*Mittelschullehrer*) in Dessau, where he taught natural history. Because of frequent illnesses in his family, he spent many years in the Canaries and Arosa. From 1892 to 1899 he worked as volunteer at the Königlich Zoologischen Museum in Dresden, studying Coleoptera and especially birds. From 1892 on he became an enthusiastic collector of Diptera, exploring principally the neighborhood of Dresden, and Corsica. From 1902 to 1904 he explored in the company of Otto Garlepp several countries of South America (Chile, Bolivia, and Peru). His collections comprised almost 50,000 specimens, of which three fourths were from South America. These rich collections were studied by several specialists, among whom are to be cited Becker (1907), Bezzi (1909), Hendl (1909), Hermann (1912), Kertész (1908), Parent (1931, 1932), and Stein (1911).

Schnuse died on 8 December 1909, at Weisser Hirsch bei Dresden of a heart attack (Horn, 1910). His collections were deposited in the Staatliche Museen für Tier- und Völkerkunde zu Dresden.

Schnuse's itinerary was the following (Schnuse, 1909):

CHILE:

- Punta Arenas (Magallanes Prov.; SN-19, 53-71d) — 2 September 1902  
Corral (sea level; Valdivia Prov.; SJ-18, 40-73a)  
Talcahuano (sea level; Concepción Prov.; SJ-18, 37-73a)  
Concepción (150 m; Concepción Prov.; SJ-18, 37-73a)  
Santiago (2200 m; Santiago Prov.; SI-19, 33-71d) — 15-16 September 1902  
Valparaiso (Valparaiso Prov.; SI-19, 33-72d) — 18-22 September 1902  
Quillota (Valparaiso Prov.; 1000 m; SI-19, 33-71a) — 20 September 1902  
Coquimbo (Coquimbo Prov.; SH-19, 30-71a)  
Guiacán (? Guayacán; Coquimbo Prov.; SH-19, 30-71a) — 23 September  
Caldera (sea level; SH-19, 29-71b) — 25 September  
Taltal (sea level; Antofagasta Prov.; SG-19, 25-70d)  
Antofagasta (sea level; Antofagasta Prov.; SF-19, 24-70a)  
Iquique (sea level; Tarapacá Prov.; SF-19, 20-70d) — 2 October  
Arica (sea level; north of Tarapacá Prov.; SE-19, 18-70c) — 5-7 October  
Palca (3000-3500 m; Tarapacá Prov.; SE-19, 19-70c)

PERU:

- Tacna (600 m; Tacna Prov.; SE-19, 18-70c) — 11-27 October 1902  
Mollendo (?; sea level to 100 m; Arequipa Prov.) — 10 November  
Arequipa (2300-2500 m; Arequipa Prov.; SE-19, 16-72d) — 14 November  
Puno (3850-4500 m; near Lake Titicaca; Puno Prov.; SD-19, 16-70b) — 18-24 November

BOLIVIA:

- La Paz (3700 m; La Paz Dept.; SE-19, 16-68c) — 26 November — 17 December 1902  
Sorata (2300 m; La Paz Dept.; SE-19, 19-67d) — 18-23 December

Cordillera Real (4,500 m of altitude; La Paz Dept.; SE-19, 16-69b) — 24 December  
 Yungas de Coroico (800 m; La Paz Dept. SE-19, 16-68d)  
 Mapiri (700-800 m; La Paz Dept.; SD-19, 15-68c) — 27-28 December 1902  
 San Carlos (?; near Mapiri, La Paz Dept.; 800 m) — 2-20 January 1903  
 Sarampioni (Sarampiuni, 700 m; La Paz Dept.; SD-19, 15-68c) — 29 February — 17 March 1903  
 Chimate (650 m; ?; near Sarampiuni)  
 Bellavista (La Paz Dept.; near Sarampiuni; SD-19, 15-68c)  
 San Carlos (?; La Paz Dept.) — 14 April  
 Lorenzopata (?; La Paz Dept.) — 25 April  
 San Carlos (?; La Paz Dept.) — 30 April  
 Lorenzopata (?; La Paz Dept.) — 1 May  
 Sorata (La Paz Dept.; SE-19, 19-67d) — 18 May  
 Guaqui (La Paz Dept.; near Lake Titicaca; SE-19, 17-69b; 3850-4500 m) — 31 May 1903

## PERU:

Puno (Puno Prov.; SD-19, 16-70a) — 8-9 May 1903  
 Juliaca (4000 m; Puno Prov.; SD-19, 16-70a) — 15 May  
 "Sienami" (= Sicuani, 3500 m; Cuzco Prov.; SD-19, 14-71c) — 17 May  
 Cuzco (3500 m; Cuzco Prov.; SD-19, 14-72b) — 27 May  
 "Pitu Pugio" (Pitupuquio, Cuzco Prov., San Gerónimo District; SD-19, 14-72b; cf. Stiglich, 1922: 834) — 3 July-4 August  
 Calca (2900 m; Cuzco Prov.; SD-19, 13-72d) — 7 August  
 "Urubambafluss" (= Río Urubamba, 2800 m; Cuzco Prov.; SD-18, 12-73c; SC-18, 11-73a)  
 Ollantaitambo (2700 m; Cuzco Prov.; SD-18, 13-72c)  
 "Laristal" (= Paso de Lares, 400-800 m; Cuzco Prov.; SD-19, 13-72d) — 9 August  
 Cuquipata (Farm; Prov. of Calca, Distr. of Lares; cf. Stiglich, 1822: 323) — 11 August  
 Rosalina del Carmen (= Rosalina, "quebrada y hacienda frente a la unión del Yanatile al Urubamba, Prov. de Convención, Distr. de Chinche, 700 m; cf. Stiglich, 1922: 935) — 14 August  
 Putucusi (Fundo [= a rural property]; Prov. of Calca, Distr. of Lares; cf. Stiglich, 1922: 880) — 16 August

Rosalina (near the *Urubamba R.*; SD-18, 13-73b) — 24-27 August,  
 30 August — 5 September  
 Umuhuankiato, or Umahuakiali (= Umuhuankiali, 500 m; ?) —  
 8 September  
 Mishagua (on the *Urubamba R.*; 350 m; SC-18, 11-73d)  
*Ucayali R.* (river voyage; 300 m; SC-18, 8-74c; SB-18, 6-75d)  
 — October to 11 November  
 Unini (300 m; SC-18, 11-74b)  
 "Pachiteamündung" (mouth of *Rio Pachitea*; 150 m; SC-18,  
 9-74a) — 11-23 November  
 On board steamer 'Amazonas' — 4 December  
 "Puerto Bermudas" (Puerto Bermúdez; 300-700 m; Pasco Prov.;  
 SC-18, 10-75d) — 6-21 December  
 Puerto Yessup (300 m; Pasco Prov.; SC-18, 10-75d) — 24 De-  
 cember 1903  
 "Pichisweg" (road to *Rio Pichis*; 300-700 m; SC-18, 10-75d — 2-3  
 January 1904  
 La Merced, Chanchamayo (800 m; Junín Prov.; SC-18, 11-75c)  
 — 8-10 January  
 Tarma (300 m; Junín Prov.; SC-18, 11-76d)  
 Oroya (3700-4000 m; Junín Prov.; SC-18, 12-76b) — 22 January  
 Lima (Lima Prov.; SD-18, 12-77c) — 26 January 1904  
 Montevideo (Uruguay) — 17 March 1904; departure for Europe.

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# Synopsis of countries and their respective zoological collectors (Vol. II)

## Antilles (Lesser)

- Bertero, 1816-1818 (Guadeloupe, St. Thomas)  
Guilding, 1817-1831 (St. Vincent)  
Ehrenberg, 1827-1828 (St. Thomas)  
Schomburgk, 1830-1834 (Aneghada)  
Moritz, 1834-1835 (St. Thomas, St. John)  
Oersted, 1845-1849 (?)  
Gollmer, 1851 (St. Thomas)  
Scherzer, 1859 (St. Thomas)  
Nolcken, 1870, 1871 (St. Thomas)  
Salvin, 1873 (St. Thomas)  
Sintenis, 1887 (St. Thomas)  
Smith (H. H.), 1889-1895 (Trinidad, St. Vincent, Windward Is.)  
Meinert, 1891 (?)  
Stoll, ? (Antigua)

## Argentina

- Rengger, 1818-1819 (along Paraná R.)  
King, 1826-1828 (*La Plata R.*, coast, Magellan Straits)  
Fitz Roy, 1829-1830 (*La Plata R.*, coast, Magellan Straits)  
Darwin, 1832-1834 (*La Plata R.*, several places in the interior, coast, Magellan Straits)

- Kiellerup, 1847 (Buenos Aires)  
 'Eugenies', 1852 (Buenos Aires, coast, Magellan Straits)  
 Burmeister, 1856-1861 (several places)  
 Strobel, 1865-1867 (from Buenos Aires to Mendoza)  
 Weyenbergh, 1872-1881 (several places; especially Córdoba)  
 Stübel, 1875-1876 (from Buenos Aires to Mendoza)  
 Soerensen, 1876-1878 (Gran Chaco)  
 F. Lynch Arribálzaga, 1877-1893 (several places, especially Baradero)  
 E. Lynch Arribálzaga, 1881-1897 (several places, especially Baradero)  
 Smith (H. H.), 1882 (Rosário, Corrientes)

### Bolivia

- Stübel, 1876 (La Paz Dept.)  
 Garlepp (G.), 1889-1891, 1892-1897 (several places)  
 Garlepp, (O.), 1893-1897, 1902-1903 (La Paz Dept.; with Schnuse)  
 Schnuse, 1902-1903 (La Paz Dept.)

### Brazil

- Swainson, 1816-1818 (Pernambuco, Alagoas, Bahia, Guanabara, Rio de Janeiro)  
 Burchell, 1825-1830 (Guanabara, Rio de Janeiro, Minas Gerais, São Paulo, Goiás, Pará)  
 King, 1826-1828 (Guanabara, São Paulo, Santa Catarina)  
 Poeppig, 1829-1832 (Amazonia)  
 Darwin, 1832 (St. Paul's Rock, Fernando Noronha, Bahia, Guanabara, Rio de Janeiro), 1836 (Bahia, Pernambuco)  
 Casaretto, 1839-1840 (Santa Catarina, São Paulo, Rio de Janeiro, Guanabara, Bahia, Pernambuco)  
 Ghiliani, 1846 (Belém, Pará)  
 Helmreichen, 1846-1857 (Minas Gerais, Bahia)  
 Osculati, 1847-1848 (*Amazons R.*)  
 Kiellerup, 1847 (Guanabara, Bahia)  
 Wallace, 1848-1852 (Amazonia)  
 Bates, 1848-1859 (Amazonia)  
 Sahlberg, 1849-1850 (Guanabara, Rio de Janeiro, Minas Gerais)  
 Reinhardt, 1850-1852, 1854-1856 (Guanabara, Rio de Janeiro, Minas Gerais)  
 Burmeister, 1850-1852 (Guanabara, Rio de Janeiro, Minas Gerais)  
 "Eugenies", 1851 (Guanabara)  
 Müller (F.), 1852-1895 (Santa Catarina)  
 "Novara", 1857 (Guanabara, Rio de Janeiro)  
 Appun, after 1859 (Amazonia)  
 Hensel, 1863-1866 (Rio Grande do Sul)

- Smith (H. H.), 1870 (Pará), 1874-1875 (Amazonia), 1876-1878 (Amazonia, Ceará), 1881-1886 (Pará, Pernambuco, Guanabara, São Paulo, Paraná, Santa Catarina, Rio Grande do Sul, and Mato Grosso [Chapada])  
 Stübel, 1875 (Amazonia; Guanabara, Santa Catarina)  
 Garlepp (G.), 1883-1887 (Amazonia)  
 Goeldi, 1894-1904 (Pará)  
 Austen, 1896 (Pará, Amazonas)  
 Graham (G. & R.), ? (Pará)  
 Smith (J. P. G.), around 1844 (Pará, Pernambuco)  
 Thieme, (?)  
 Badgerley (?)  
 Harrington (?)  
 Mornay (?)  
 Noel (?)  
 O'Reilly (?)  
 Sinclair (?)  
 Stephens (?)  
 Stewart (?)  
 Tucker (?)

### Central America

- Cuming, between 1828 and 1830 (Panama, Costa Rica, Nicaragua, Honduras)  
 Oersted, 1845-1848 (Costa Rica, Nicaragua)  
 Salvin, 1857-1858, 1859-1869 (Guatemala, Belize), 1873-1874 (Guatemala)  
 Scherzer, 1859 (Panama)  
 Salvin & Godman, 1861-1863 (Guatemala and Belize)  
 Belt, 1868-1872 (Nicaragua)  
 Champion, 1879-1883  
 Godman, 1888 (northern Guatemala)  
 Festa, 1895 (Panama)  
 Müller (?)  
 Stewart, ? (Honduras)  
 Blancaneaux, ? (British Honduras)  
 Janson, ? (Nicaragua)  
 Rogers, ? (Costa Rica)

### Chile

- Cuming, 1822-1828, 1830-1831 (several places)  
 Poepig, 1827-1829 (?)  
 Bertero, 1827-1830 (several places)  
 Fitz Roy, 1829-1830 (Magellan Straits to Chiloé)  
 Darwin, 1834 (several places)

- Kiellerup, 1847 (coast)  
 Philippi, 1851-1904  
 Paulsen, 1851-1865  
 Krause, 1851-1865  
 Röhner, 1851-1865  
 Cox, 1851-1865  
 Scythe, 1851-1865  
 "Eugenies", 1852 (coast)  
 Fonck, 1857 (Chonos Archipelago)  
 "Novara", 1859 (coast, other places in the interior)  
 Scherzer, 1859 (several places)  
 Landbeck, 1862 (several places)  
 Garlepp (O.), 1902 (with Schnuse)  
 Schnuse, 1902 (From Punta Arenas to Palca)

### Colombia

- Bertero, 1820-1821 (*Magdalena R.*)  
 Cuming, between 1828 and 1830 (Pacific coast)  
 Karsten, 1848-1856 (?)  
 Scherzer, 1859 (Cartagena)  
 Stübel, 1868-1870 (several places)  
 Nolcken, 1870-1871 (along *Magdalena R.*, surroundings of Bogotá)  
 Steinheil, 1872-1873 (along *Magdalena R.*; surroundings of Bogotá)  
 Petersen, 1875-1877 (?)  
 Garlepp (O.), 1898-1899 (?)  
 Smith (H. H.), 1898-1902 (Santa Marta region)  
 Pehlke, ?-1920 (Hacienda Pehlke, Dept. Caldas)  
 Lindig (?)

### Cuba

- Poepig, 1822  
 Osten Sacken, 1857-1858  
 Müller (?)

### Ecuador

- Cuming, 1828-1830 (coast; Galápagos Is.)  
 Darwin, 1835 (Galápagos Is.)  
 Osculati, 1847 (from Guayaquil to the Napo R.)  
 Karsten, 1848-1856 (?)  
 Stübel, 1870-1874 (several places)  
 Festa, 1895-1897 (several places)

### Guyana

Schomburgk, 1834-1839, 1840-1844  
Appun, 1849-1859

### Hispaniola

Ehrenberg, 1828-1831 (Haiti)  
Bertero, 1819-1820

### Jamaica

Gosse, 1844-1846  
Godman & Salvin, 1861  
Nolcken, 1870  
Salvin, 1873

### Mexico

Ehrenberg, 1831-1840 (Mexico City and 30 leagues towards the interior)  
Liebmann, 1840-1843 (From Veracruz to the forests of Orizaba)  
Saussure, 1855-1856  
Sumichrast, 1855-1882 (several places; especially Tehuantepec)  
Bilimek, around 1866 (Cacahuamilpa Caves)  
Godman, 1887-1888  
Trujillo, 1887-1888  
Smith (H. H.), 1889  
Koeppen (?)  
Uhde (?)  
Morrison (?)  
Forrer, ? (s. w. Mexico, Tres Marias Is.)  
Höge, ? (All Mexican States, Tamaulipas and Yucatán excepted)  
Schumann (?)  
Coffin (?)  
Glennie (?)  
Gaumer, ? (Yucatán)

### Paraguay

Renger, 1819-1825  
Smith (H. H.), 1882 (along R. Paraguay)

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**Peru**

- Cuming, 1828 (coast)  
Poeppig, between 1829 and 1832 (?)  
Darwin, 1835 (Iquique, Callao, Lima)  
Osculati, 1847 (Pebas, Loreto)  
Kiellerup, 1847 (coast)  
"Eugenies", 1852 (Callao, Lima)  
Scherzer, 1859 (coast)  
Appun, after 1859 (?)  
Stübel, 1874-1875 (several places; *Huallaga R.*, Loreto)  
Garlepp (G.), 1884-1887 (Amazonia, *Ucayali R.*)  
Garlepp (O.), 1902, 1903-1904 (with Schnuse)  
Schnuse, 1902 (Tacna, Arequipa and Puno Depts.), 1903-1904 (several places;  
rivers *Urubamba* and *Pachitea*)  
Thieme (?)

**Puerto Rico**

- Bertero, 1818-1819  
Moritz, 1835  
Krug, 1857-1876  
Sintenis, 1884-1887

**Uruguay**

- King, 1826-1827 (southern coast)  
Darwin, 1832-1833 (several places)  
Casaretto, 1839-1840 (Montevideo)  
Kiellerup, 1847 (Montevideo)  
"Eugenies", 1852 (southern coast)  
Schnuse, 1904 (Montevideo)

**Venezuela**

- Moritz, 1835-1837 (coast, *Apure*, *Orinoco*, States of Trujillo and Merida),  
1840-1866 (La Guayra)  
Karsten, 1843-1847 (?)  
Appun, 1849-1859 (?)  
Wallace, 1851 (southern parts)  
Gollmer, 1852-1857 (Caracas)  
Meinert, 1891-1892 (?)  
Festa, 1895 (La Guayra)

## Chronological Table

- 1735. Publication of the first edition of the 'Systema Naturae'
- 1741. Birth of Linnaeus Jr.
- 1743. Birth of Thunberg and Banks
- 1745. Birth of Fabricius
- 1750. Treaty of Madrid, between Portugal and Spain, defining the frontiers between their colonies in South America
- 1752. Birth of Palisot de Beauvois
- 1754. Birth of L. C. M. Richard
- 1754-56. Loefling travels through Venezuela and dies near the Orinoco
- 1755-56 Rolander and Dahlberg collect in Surinam
- 1756. Birth of Olivier
- 1758. Publication of the 10th edition of the 'Systema Naturae' with the inclusion of first species of Diptera collected by Loefling and Rolander; publication of Loefling's 'Iter Hispanicum'
- 1759. Birth of Bosc
- 1760. Birth of J. da S. Feijó
- 1762. Birth of Latreille
- 1764. Birth of Meigen
- 1765. Rohr collects in St. Croix
- 1768-69. Banks and Solander travel with Captain Cook aboard the 'Endeavour' and collect in Rio de Janeiro and Patagonia
- 1769. Birth of Alexander von Humboldt, F. Agostinho Gomes, and J. C. Mikán
- 1770. Birth of Wiedemann

1773. Birth of Leschenault de la Tour  
 1774. Birth of Georg H. von Langsdorff  
 1775. Publication of Fabricius' 'Systema Entomologiae'; birth of Forsström  
 1776. Birth of Macquart; publication of Fabricius' 'Genera Insectorum'  
 1778. Death of Linnaeus  
 1779. Birth of A. Saint Hilaire  
 1780('s). Smidt in the Lesser Antilles and Surinam  
 1781. Fabricius' 'Species Insectorum'; Linnaeus Jr. publishes the description of *Oestrus hominis*; birth of Spix  
 1781-85. Richard collects in French Guiana  
 1782. Death of Solander; birth of J. E. Pohl and W. J. Burchell  
 1783. Death of Linnaeus Jr.; Rohr collects in Jamaica, Puerto Rico, the Lesser Antilles, and in the Caribbean Coast of South America; J. E. Smith acquires the collections of Linnaeus, which are transferred to England  
 1785. Richard collects in Belém (Pará, Brazil)  
 1786. Richard travels through the Lesser Antilles; birth of Swainson  
 1787. Publication of Fabricius' 'Mantissa Insectorum'; birth of Natterer, Delalande, and Plée  
 1788. Gmelin publishes the 13th edition of the 'Systema Naturae'  
 1789. French Revolution; Richard returns to Europe; birth of Sellow and Freyreiss; birth of Gaudichaud-Beaupré  
 1790-93. Palisot de Beauvois collects in Hispaniola  
 1791. Birth of Cuming  
 1793. Death of Rolander and Rohr; birth of Eschscholtz  
 1794. Fabricius' 'Entomologia Systematica'; Bosc collects in Cayenne; birth of Martius and Deppe  
 1797. Birth of L. Guilding  
 1798. Fabricius' "Supplementum Entomologiae Systematicae"  
 1799. Birth of Guérin-Méneville, Robineau-Desvoidy, and F. Poey  
 1799-1800. Pflug collects in St. Croix; Humboldt and Bonpland start their travels in the Americas, exploring Venezuela  
 1800. Meigen publishes the 'Nouvelle classification des mouches à deux ailes'; birth of C. Gay and H. B. Hornbeck  
 1800-03. Humboldt and Bonpland travel through Cuba, Nueva Granada and Peru  
 1800-1815. Feijó explores the Capitania do Ceará (Brazil)  
 1801. Birth of P. W. Lund and T. Lacordaire  
 1801-13. Friedrich Sieber collects in the Brazilian Amazonia for Count von Hoffmannsegg  
 1802. Birth of Ménétriés, Doumerc, and d'Orbigny  
 1803. Meigen's "Versuch einer neuen Gattungseintheilung"  
 1803-04. Agostinho Gomes collects in Bahia and Pernambuco; Humboldt and Bonpland in Mexico; Baron von Langsdorff's first voyage to Brazil (Santa Catarina)  
 1804. Birth of M. Perty and P. Claussen  
 1805. Fabricius publishes the first dipterological monograph, the 'Systema Antliatorum', describing the flies collected by Rohr, Banks and Solan-

- der, Smidt, Richard, Bosc, Palisot de Beauvois, Pflug, and Yeats; birth of Fitz Roy and Westwood
- 1805-12. Forsström collects in St. Barthélemy, Saba, and Guadeloupe
1807. Birth of Hermann Loew
1808. Death of Fabricius; Portugal invaded by Napoleonic troops; Dom João VI arrives to Brazil; birth of Rondani and Philippi
1809. Birth of Erichson, Walker, Saunders, and Darwin
1810. Birth of Gosse
1811. Publication of Latreille's 'Insectes de l'Amérique Equinoxiale', describing the insects collected by Humboldt and Bonpland
- 1811-12. Olivier describes new Diptera in the 'Encyclopédie Méthodique'
1813. Arrival of Langsdorff and Freyreiss in Brazil; birth of Schiner
1814. Wied-Neuwied and Sellow arrive in Rio de Janeiro; Freyreiss travels in Minas Gerais; Sellow collects in Rio de Janeiro for Banks and Sims; death of Olivier; publication of Humboldt's 'Relation Historique', in his 'Voyage aux régions équinoxiales du nouveau continent'
1815. Brazil elevated to United Kingdom by Dom João VI
- 1815-17. Eschscholtz collects in Brazil (Santa Catarina) and Chile
- 1815-18. Sellow, Wied-Neuwied and Freyreiss collect in Rio de Janeiro, Espírito Santo and Bahia
1816. Saint Hilaire and Delalande collect in Rio
- 1816-17. Langsdorff and Saint Hilaire travel to Minas Gerais
- 1816-18. Swainson explores Brazil, from Pernambuco to Rio de Janeiro; Bertero collects in Guadeloupe
1817. Gaudichaud-Beaupré's first voyage (with Freycinet); marriage of Dom Pedro de Alcântara (future Emperor of Brazil) with the Austrian Archduchess Leopoldina; arrival of a commission of Austrian naturalists in Brazil; Bonpland migrates to Argentina
- 1817-31. Rev. L. Guilding collects in St. Vincent (W. I.)
- 1817-18. Natterer begins his collections in Rio; Mikán also explores that Province
- 1817-21. Pohl travels through Rio de Janeiro, Minas Gerais, Goiás, and Mato Grosso
1818. Birth of Bellardi, Bigot, an Wulp; Mikán leaves Brazil; Saint Hilaire collects in Espírito Santo; Thunberg describes '*Mydas gigantea*'
- 1818-19. Bertero collects in St. Thomas and Puerto Rico; Rengger collects along the Paraná R. in Argentina
- 1818-20. Olfers and Sellow journey to Minas Gerais and São Paulo; Natterer travels to Angra dos Reis and São Paulo; Spix and Martius collect in Rio de Janeiro, São Paulo, Minas Gerais, Bahia, Pernambuco, Maranhão, Pará and Amazonas
- 1818-25. Rengger collects in Argentina, and enters Paraguay, being detained by Dictator Francia
1819. Wiedemann publishes the 'Brasilianische Zweiflügler', based on the collections gathered by Sieber, Gomes, and Feijó, for Count von Hoffmannsegg; Humboldt publishes his travels; birth of Blanchard; Saint Hilaire travels to Minas Gerais, São Paulo, and Paraná
- 1819-20. Bertero collects in Santo Domingo

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1820. Saint Hilaire collects in Rio Grande do Sul and Uruguay; Freycinet shipwrecks in the Falklands, and aboard the 'Physicienne' collects in the southern Atlantic coast of South America; death of Sir Joseph Banks and Palisot de Beauvois
- 1820-21. Natterer collects in São Paulo and Paraná; Plée collects in the Lesser Antilles; Sellow explores southern Brazil and Uruguay; Bertero travels through Nueva Granada (Colombia); trips of Saint Hilaire in Rio Grande do Sul
1881. Publication of Wiedemann's 'Diptera exotica'; independence of Mexico; Bescke (senior) collects in several places along the Brazilian coast; death of Richard; Bonpland is arrested by the Paraguayan Dictator Francia, remaining in prison until 1829.
- 1821-22. Natterer establishes his headquarters in Ipanema (São Paulo)
1822. Independence of several South American States — Venezuela, Colombia, Ecuador, Peru, and Bolivia, separate from Spain; Dom Pedro I proclaims the independence of Brazil; voyage of 'La Coquille'; birth of Fritz Müller; Saint-Hilaire's last trip to Minas Gerais and São Paulo; Thunberg describes the first Pantophthalmidae; Poeppig collects in Cuba
- 1822-23. Plée collects in Puerto Rico and Vieques
- 1822-24. Natterer travels to Goiás and Mato Grosso; Ménétriés collects in Minas Gerais and São Paulo
- 1822-26. Cuming's first collections in Chile
- 1822-27. Silveira Caldeira ("Sylveira" of Macquart) sends the collections of the Brazilian National Museum to Paris
1823. Erichson publishes his 'Entomographien', describing the new species of Acroceridae collected by Langsdorff, Bescke, Sellow, and Virmond; birth of A. R. Wallace
- 1823-24. Leschenault de la Tour and Doumerc collect in Brazil, French Guiana and Surinam
1824. Wiedemann publishes the 'Analecta Entomologica'; travels of Bougainville Fils; Plée collects in the coasts of Venezuela; birth of Thomson; death of Feijó and Forsström
- 1824-25. Deppe collects in Mexico; Langsdorff, Ménétriés and Rugendas travel to Minas Gerais
1825. Langsdorff starts his ill-fated expedition to the interior of Brazil; Lund collects in Rio de Janeiro; death of Plée; birth of Bates
- 1825-26. Voyage of 'La Thétis' and 'L'Espérance'
- 1825-29. Natterer collects in Mato Grosso; Langsdorff travels through São Paulo, Mato Grosso, Amazonas, and Pará
- 1825-30. Burchell goes from Rio and São Paulo to Belém (Pará)
- 1825-44. Hornbeck collects in St. John, St. Thomas, St. Croix, and Puerto Rico
1826. Captain King's survey of the Straits of Magellan; death of Spix
- 1826-33. d'Orbigny explores several countries in South America
- 1827-28. Ehrenberg collects in St. Thomas
- 1827-29. Poeppig collects in Chile
- 1827-30. Bertero travels in Chile

- 1827-31. Voyages of Cuming along the Pacific coasts of America
1828. Publication of Wiedemann's first volume of the "Aussereuropäische zweiflügelige Insekten", describing the Diptera collected by Sieber, Gomes, Feijó, Langsdorff, Freyreiss, Olfers, Sellow, Eschscholtz, Humboldt, Hornbeck, etc.; Gay starts the exploration of Chile; birth of Osten Sacken and Gerstaecker; death of Thunberg, Bosc, and Delalande; independence of Uruguay
- 1828-31. Ehrenberg collects in Haiti
- 1829-30. Natterer goes through the rivers Guaporé, Mainoré and Madeira, to Borba, in Amazonas; Fitz Roy's survey of the Magellan Straits, brings Fuegians to Europe
- 1829-32. Poeppig travels through the Brazilian Amazonia and Peru
1830. Publication of the second volume of the 'Aussereuropäische zweiflügelige Insekten'; publication of Robineau-Desvoidy's 'Essai sur les Myodaires'
1831. Death of Rev. L. Guilding
- 1830-31. Natterer explores the Brazilian Amazonia
- 1830-34. Schomburgk in Anegada (W. I.)
1831. Travels of Lacordaire in French Guiana; Guérin-Méneville publishes the zoological results of the voyages of the "Coquille"; Wiedemann publishes a revision of the Mydidae; death of Eschscholtz and Sellow
- 1831-32. Voyage of 'La Favorite'; travels of Vauthier in Brazil
- 1831-35. Voyage of 'L'Herminie'; after exploring several rivers of the Amazon Basin, Natterer returns to Europe, after 18 years of collecting
- 1831-40. Ehrenberg collects in Mexico
1832. Leprieur in French Guiana; birth of Brauer
- 1832-36. Darwin collects in several places in South America, during the cruise of the "Beagle"
1833. M. Perty describes the Diptera gathered by Spix and Martius in the 'Delectus animalium articulatorum'; death of Latreille
1834. Macquart publishes the first volume of Diptera of the 'Suites à Buffon'; death of Pohl; Darwin in Chile
- 1834-35. Moritz collects in St. Thomas, St. John and Puerto Rico.
- 1834-39. Schomburgk's first trip in Guyana
- 1834-42. Gay explores Chile
1835. Macquart publishes the second volume of the "Suites à Buffon"; Guérin-Méneville publishes the insect section of Cuvier's 'Régne Animal'; Westwood, his 'Insectorum novorum', and Darwin explores Peru, and the Galápagos Is., finding evidences for the new theory on evolution; Moritz collects in Puerto Rico
- 1835-37. Linden collects in Brazil (Rio de Janeiro, São Paulo, Minas Gerais); Moritz collects in Venezuela
1836. Death of Leach
- 1836-37. Gaudichaud-Beaupré travels with "La Bonite"
1837. Walker describes the Diptera collected by Captain King in the survey of the Straits of Magellan
- 1837-38. Linden collects in Cuba

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1838. Publication of Macquart's first part of the 'Diptères exotiques'
- 1838-41. Linden collects in eastern Mexico (Veracruz to Mexico City), Yucatán, and northern Guatemala
1839. Birth of Mik; Beaupertuis collects in Guadeloupe; Madame Rivoire in Martinique
- 1839-40. Casaretto collects in Bahia, Rio de Janeiro, São Paulo, and Uruguay
- 1839-59. Gundlach explores Cuba
1840. Publication of the first part of the second volume of Macquart's 'Diptères exotiques'; death of Wiedemann; birth of Becker; Ghiesbrecht collects in Tabasco (Mexico); Westwood's 'Introduction to the modern classification of insects'; death of Agostinho Gomes; Erichson's 'Die Henopier' (Acroceridae)
- 1840-43. Liebmann in Mexico
- 1840-66. Moritz in Venezuela
1841. Westwood's 'Synopsis of the Midasidae'; Pissis in Brazil
- 1841-44. Linden collects in Jamaica and Cuba
1842. Second part of the second volume of the "Diptères exotiques"; birth of Weyenbergh; Westwood's monograph on *Systropus*
1843. Death of Natterer
- 1843-47. Castelnau and naturalists explore several South American countries and the West Indies; Karsten in Venezuela
1844. Gosse collects in Jamaica; Funck in Guadeloupe, the Lesser Antilles, Venezuela and Colombia; death of Mikán; J. P. G. Smith in Pará and Pernambuco (Brazil)
- 1845-48. Oersted in the Lesser Antilles and Central America
- 1845-52. Pilate in Mexico
1846. First supplement of the 'Diptères exotiques'; Ghiliani collects in Belém (Pará); Helmreich collects in Minas Gerais
1847. 'Diptères exotiques', second supplement; Kiellerup in Peru, Chile, Argentina, Uruguay and Brazil
- 1847-48. Osculati explores the Napo and the Amazons
1848. "Diptères exotiques", third supplement; Rondani publishes his 'Esame de varie specie d'insetti ditteri brasiliensi'; Walker's first volume of the 'List of the Diptera of the British Museum'; Westwood publishes on Acroceridae
- 1848-56. Karsten collects in Colombia and Ecuador
- 1848-59. Bates explores the Brazilian Amazonia
- 1848-52. Wallace travels through the Amazonia
- 1848-67. Pissis works in Chile
1849. Publication of volumes 2-4 of Walker's 'List'; death of Erichson
- 1849-50. Sahlberg travels in Rio de Janeiro and Minas Gerais
- 1849-59. Appun in Guyana and Venezuela
1850. First part of the fourth supplement of Macquart's 'Diptères exotiques'; Rondani describes the Diptera collected by Osculati; Walker publishes the first part of the 'Insecta Saundersiana'
- 1850-52. Burmeister in Brazil; Reinhardt's first trip to Minas Gerais

1851. Second part of the fourth supplement of the 'Merorías sobre la historia natural de la Isla de Cuba'; second part of the 'Insecta Saundersiana'; Loew publishes on Asilidae; Philippi arrives in Chile; death of C. H. Bescke; birth of H. H. Smith; Gollmer collects in St. Thomas, Wallace in southern Venezuela
- 1851-52. Voyage of the frigate 'Eugenies'
- 1851-65. Philippi, Paulsen, Krause, Röhner, Cox, Scythe and Landbeck start the systematic exploration of Chile
1852. Blanchard publishes on the Diptera collected by Gay in Chile; third part of the 'Insecta Saundersiana'; birth of Williston; death of Langsdorff; Fritz Müller's arrival in Santa Catarina
- 1852-57. Gollmer collects in St. Thomas and Venezuela
- 1852-94. Travels of Boucard in the United States, Mexico, Central America, Chile, etc.
1853. Death of Saint Hilaire
- 1853-1913. P. Germain explores Chile and several other regions of South America
1854. Publication of the fifth volume of Walker's 'List of the Diptera'; birth of Félix Lynch Arribálzaga; death of Gaudichaud-Beaupré
- 1854-56. Reinhardt's second trip to Minas Gerais
1855. Death of Macquart
- 1855-56. Rojas collects in San Fernando de Apure, Venezuela; Sumichrast and Saussure in Mexico.
1856. Gerstaeker on the 'Henopier' (Acroceridae); conclusion of 'Insecta Saundersiana'; birth of Enrique Lynch Arribálzaga
- 1856-1861. Burmeister's travels in Argentina, he becomes director of the Natural History Museum in Buenos Aires
1857. The naturalists of the frigate 'Novara' collect in Rio de Janeiro; Bigot publishes the Diptera of Cuba collected by La Sagra; death of Robineau-Desvoidy and A. d'Orbigny; Fonck explores the Chonos Archipelago; birth of Rübsaamen
- 1857-58. Salvin in Belize and Guatemala; Osten Sacken collects in Cuba
- 1857-76. Krug explores Puerto Rico
1858. Coquerel describes *Lucillia hominivorax* from Cayenne; Walker publishes Characters of undescribed insects; death of Bonpland
1859. Darwin's 'Origin of Species'; Bellardi's 'Saggio di ditterologia messicana'; the 'Novara' expedition collects in Chile, and Scherzer proceeds to Panama and St. Thomas; birth of E. Goeldi; death of Humboldt; Appun in Amazonia and Peru
1860. Walker's 'Characters of undescribed Diptera'; death of Deppe
1861. Publication of the second part of Bellardi's 'Saggio'; Loew publishes the Diptera of Cuba, collected by Baron Osten Sacken; Walker's 'Characters' concluded; death of Ménétriers; Salvin and Godman in Jamaica
- 1861-63. Salvin and Godman in Belize and Guatemala
1862. Publication of the 'Appendice' to Bellardi's 'Saggio'
1863. Fritz Müller's 'Für Darwin'; Brauer's 'Monographie der Oestriden'; Rondani's 'Diptera exotica'; death of Burchell, his collections donated to Oxford

- 1863-66. Hensel explores Rio Grande do Sul (Brazil)
1865. Birth of Giglio-Tos; Philippi publishes the 'Aufzählung der chilenischen Dipteren'; death of Cuming
- 1865-67. Strobel collects in Argentina
- 1865-95. Eugène Dugès collects in Guanajuato (Mexico)
1866. Bilimek studies the fauna of the Cacahuamilpa Cave in Mexico; Jaennicke publishes his 'Exotischen Dipteren'; birth of Kertész; birth of Aldrich; Schiner revises the Asilidae described by Wiedemann, and publishes the first paper on the Diptera brought home by the 'Novara'
1867. Schiner's second paper on the Diptera of the 'Novara'
1868. Gerstaecker's paper on Mydidae; Schiner publishes the complete results of the 'Novara' expedition; death of Martius and Doumerc
- 1868-70. Stübel in Colombia
- 1868-72. Belt collects in Nicaragua
1869. Publication of the dipterological results of the 'Eugenies' circumnavigation, by Thomson
1870. First trip of H. H. Smith in Brazil (Amazonas); death of Hornbeck and Lacordaire
- 1870-71. Baron von Nolcken in St. Thomas, Jamaica, and Colombia
- 1870-74. Stübel in Ecuador
1872. Death of Olfers; Weyenbergh's arrival in Argentina
- 1872-73. Steinheil in Colombia
1873. Death of Schiner; Gundlach explores Puerto Rico; Salvin in St. Thomas and Jamaica
- 1873-74. Third trip of Salvin to Guatemala
1874. Death of Walker and Guérin-Méneville; H. H. Smith's second trip in the Amazons
- 1874-75. Stübel in Peru
1875. Second visit of Gundlach to Puerto Rico; Stübel in Amazonia, Rio de Janeiro, and Santa Catarina; birth of Hunter
- 1875-76. Stübel travels from Buenos Aires to Mendoza
- 1875-77. Petersen collects in Colombia
1876. Westwood publishes on new genera and species of Acroceridae; Stübel explores Bolivia (La Paz Dept.)
1877. Boucard in Costa Rica
1879. Publication of the first parte of Lynch Arribálzaga's 'Asilides Argentinos'; death of Rondani and Loew; Fritz Müller's paper on mimicry
- 1879-83. Mathan collects in Amazonia, and Champion in Central America
1880. Death of P. W. Lund
1881. Wulp's 'Amerikaansche Diptera'; Westwood on Tipulidae
- 1881-86. H. H. Smith collects in southern Brazil, Argentina and Paraguay, and stays in Mato Grosso (Chapada)
1882. Death of Darwin
- 1884-87. Garlepp in Amazonia and Peru
- 1884-85. Gounelle explores Rio de Janeiro, Minas Gerais and Bahia

- 1884-1900. Mathan goes from the Peruvio-Brazilian border to Ecuador and Colombia
1884. Death of Perty
- 1884-87. Sintenis collects in Puerto Rico and St. Thomas
1885. Roeder's "Dipteren von Portorico"; death of Weyenbergh
1886. Roeder publishes on the Diptera collected by Stübel
1887. Sintenis in St. Thomas
- 1887-88. Godman and Trujillo in Mexico
1888. Death of Gosse
- 1888-89. Gounelle collects in Bahia (Brazil)
- 1888-90. Wulp publishes the Muscidae portion of the *Biologia Centrali-Americana*
1889. Brauer and Bergenstamm's first volume on Muscoidea; H. H. Smith collects in Mexico for Godman and Salvin; death of Bellardi
- 1889-91. Garlepp in the Amazonas (second trip)
- 1889-95. H. H. Smith explores the West Indies — — —
- 1890-97. Giglio-Tos publishes on neotropical flies
1891. Second part of Brauer and Bergenstamm's revision of the Muscoidea; Félix Lynch Arribálzaga publishes the 'Dipterología Argentina'; Williston describes the new species collected by H. H. Smith, in the 'Diptera Brasiliana'; death of Poey; Meinert collects in the Lesser Antilles
- 1891-92. Meinert in Venezuela
1892. Publication of the first part of Giglio-Tos' 'Ditteri del Messico'; death of Westwood and Bates
- 1892-93. Gounelle in Pernambuco
- 1892-97. G. Garlepp explores Bolivia
1893. Third part of Brauer and Bergenstamm's revision of the Muscoidea; second part of 'Ditteri del Messico'; death of Bigot — —
- 1893-97. Garlepp's third voyage to the Amazonas
1894. Brauer and Bergenstamm and Giglio-Tos complete the publication of their respective works; Rübsamen publishes the revision of the "aussereuropäische Trauermücken"; death of Félix Lynch Arribálzaga; Goeldi in Pará
1895. Death of Gerstaeker; Gounelle goes from Pernambuco to Ceará; Festa in Panama and Venezuela (La Guayra)
- 1895-97. Festa collects in Ecuador
- 1895-1903. Wulp publishes the Muscoidea of the *Biologia Centrali-Americana*.
1896. Williston's 'Diptera of St. Vincent', describing the flies collected by H. H. Smith; Austen collects in the Amazonas
- 1898-99. Gounelle collects in São Paulo, Rio de Janeiro, and Minas Gerais; Otto Garlepp in Colombia
- 1898-1902. H. H. Smith collects in the Santa Marta region of Colombia
1899. Death of Thomson and Wulp
1900. Death of Blanchard
- 1900-01. Williston publishes in the *Biologia Centrali-Americana*

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- 1901. Aldrich on Dolichopodidae
- 1901-03. Gounelle in Rio de Janeiro and Minas Gerais
- 1901-06. Paul Rivet's 'Mission de l'Arc Méridien'
- 1902. Aldrich publishes on the Dolichopodidae of Grenada (W. I.); Schnuse and O. Garlepp collect in Chile, Peru, and Bolivia
- 1903. Schnuse collects in Bolivia and Peru
- 1904. Schnuse leaves Peru, going to Montevideo (Uruguay), and embarking to Europe; death of Philippi and Brauer
- 1905. Aldrich publishes the catalogue of North American Diptera; Goeldi's 'Mosquitos do Pará'
- 1906. Death of Baron Osten Sacken

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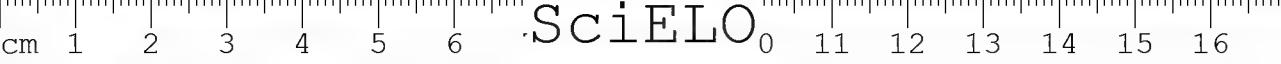
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